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JPRS-WST-86-003

16 January 1986

West Europe Report

SCIENCE AND TECHNOLOGY

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WEST EUROPE REPORT

SCIENCE AND TECHNOLOGY

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AEROSPACE

SEP EXCEEDS EXPECTED 1985 RESULTS, PREPARES EUREKA PLAN

Paris ELECTRONIQUE ACTUALITES in French 25 Oct 85 p 1

[Article signed H.P.: "With FF 3 Billion for 1985, Orders Received by SEP Will Exceed Projections"]

> [Text] For SEP (European Propulsion Company) 1985 sales will be in agreement with projections (FF 2.2 billion). On the other hand, the orders received, already estimated at some FF 3 billion, should exceed the FF 2.6 billion initially projected. Mr Lesgards, the company chief executive officer, also recently disclosed to the press that the company was determined to get involved in the Eureka program in the field of new materials and electronics (magnetic bearings). Also, SEP will make the heat-shields of the Hermes spacecraft.

As projected, SEP sales this year will amount fo FF 2.2 billion, compared with FF 1.8 billion last year. Over one half of the billings (53 percent) were for Ariane-related activities and satellite equipment from the liquid-propellant and space division. The Power-Propellant and Composites Division accounted for 40 percent of sales (ballistic and tactical missiles and new materials). As for image receiving and processing stations (Image-Processing Division), they will represent 7 percent of the 1985 sales of SEP. The company, whose personnel increased from 3,530 to 3,740 this year, should achieve a net 1985 profit in excess of FF 18 million (FF 15.5 million in 1984). To ensure its 1986 growth, which is expected to reach about 30 percent, SEP could call on private capital. The company is quoted on the stock exchange. Dividends, which amounted to FF 16 per share for the year 1984, should be slightly higher in 1985. As is known, the capital of SEP is held by SNECMA [National Aircraft Engine Study and Manufacturing Company] (50.14 percent), Aerospatiale (14.23 percent), SNPE [National Powder and Explosive Company] (8.60 percent), Air Liquide (7.08 percent), with close to 20 percent in the hand of other shareholders.

FF 300 Million in Image Processing

SEP will receive close to FF 3 billion of orders in 1985, including FF 1.6 billion for liquid propulsion and space, FF 1.1 billion for powder-propellant

and composites and FF 0.3 billion for image processing. The largest orders already received amounted to FF 2 billion early in October. Two large contracts are expected before the end of the year. On the one hand, production of a batch of Ariane-3 and Ariane-4 launchers and, on the other hand, a contract appointing SEP prime contractor for the first development stage of the large Vulcain cryogenic engine that will equip Ariane-5 in 1995. As is known, the Ariane-5 program is estimated at FF 15 billion, over 25 percent of which will be spent on engine development. Following an FF 550-million engineering contract, SEP should obtain an FF 1 billion contract for engine testing.

In the field of image processing, a contract for about FF 100 million was signed by SEP and the Pakistanese space agency SUPARCO [expansion unknown]; it covers the development of a receiving and processing station for the images transmitted by the French Spot and the U.S. Landsat-5 satellites. This facility will be set up in the north of the country. This will be the fourth large station installed abroad by SEP, after those of Sweden, Brazil and Bangladesh. By the end of the year, the company will have received FF 300 million's worth or orders for this activity. In addition to the Pakistanese order, the order book will also include an order from the U.S. subsidiary of Spot-Image, which wants to equip its Washington center with a processing station for the images received by Canadian facilities. The contract is worth about FF 40 million. There is also some hope in India. Indeed, Indian officials want to have small satellite-image processing stations distributed over all the Indian territory, to be used in agriculture, in irrigation, etc. This is a new segment as far as processing stations are concerned, and it might open interesting prospects, in particular in Brazil. These results are deemed encouraging by Mr Lesgards, who does not conceal that this activity is not yet balancing its accounts but should show a profit in 1986. Image-processing is a young sector which requires SEP to make large investments and in which it is in keen competition with the Japanese, the Americans and the Canadians. SEP is currently in negotiation with MATRA [Mechanics, Aviation and Traction Company] concerning image processing. The subject of the negotiations has not been disclosed. SEP is also making a survey of the market for this new technique.

Strong Growth of Magnetic Bearings in Japan

Another leading sector, that of active magnetic bearings, is represented by the S2M [Magnetic Mechanics Company] subsidiary of SEP. Its 1985 sales will amount to about FF 20 million. They amounted to FF 17 million last year. This activity shows a profit. S2M has two subsidiaries, accounting for sales of FF 10 million. One is in the United States and is a joint subsidiary with the Kollmorgen Company; the other is in Japan, and Seiko holds 50 percent of its shareholders' stock. It is in Japan that growth was the strongest and, in time, sales from this subsidiary will equal those of the parent company. Among the R&D orientations of S2M we find digital processing; it should very soon replace analog processing, now used for magnetic bearing control. SEP is contemplating projects using active magnetic bearings on high-performance machine tools, under the Eureka program. For the time being, these projects are not the subject of short-term proposals, but negotiations are in progress, especially in Germany and in Sweden.

Under Eureka, SEP is preparing to play an important part in the field of composite materials. A 5-year program that will cost a total of FF 500 million covers the ceramics used in medium-power Diesel engines, medium-power industrial and aeronautical gas turbines, and low-power turbines. Carbon materials are the subject of applications in the field of high-speed train braking.

For the Hermes spacecraft, SEP is offering heat shields for the parts exposed to high temperatures. These materials ally the mechanical properties of composites and the heat resistance of ceramics.

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CSO: 3698/115

AEROSPACE

SECOND ARIANE LAUNCHING FACILITY COMPLETED

Paris ESA BULLETIN in French No 42, 1985 pp 70-74

[Article by C. Dana of the Department of Space Transport Systems of the ESA [European Space Agency]

[Text] Built near the current launching facility at Kourou in French Guiana, the second Ariane launching facility (ELA-2) stands out for the significant size of its structures.

Construction of this new facility, begun in mid-1981 within an ESA program in which seven member states are participating, was virtually completed at the end of 1984: the only thing remaining to do in 1985 is the final validation work for an initial launch in the second half of 1985.

ELA-2 is destined to become, starting in 1986, the European launching facility normally used for Ariane launchers with the former Ariane launching facility (ELA-1) maintained as a redundant emergency system.

Two major reasons forced the construction of ELA-2:

-to have a permanent launch facility to increase the availability of the launch systems for the Ariane 3 launcher, an important consideration in the marketing credibility of the launcher,

-to permit the launching of Ariane 4, a significant improvement in the Ariane which is not compatible with ELA-1.

The basic goals for the design of ELA-2 are

-to increase the tempo of launches by removing the launch zone from the launcher preparation zone,

-to optimize operating costs by reducing operational constraints.

ELA-2 consists basically of two distinct zones: the launcher preparation zone and the launch zone.

The launcher preparation zone is independent and is located at a safe distance (950 meters) from the launch zone. The two zones are interconnected by a roller path on which the mobile launch platforms are transported.

The physical separation of the launcher preparation zone from the launch zone is the most important characteristic of ELA-2. This configuration allows a great flexibility in the use of the launch systems because one launcher may be erected, assembled and tested in the preparation zone at the same time that the preceding launcher, delivered to the launch zone erected on its mobile launch platform, undergoes final testing for its imminent launch there.

Parallel use of the preparation and launch zones of ELA-2 thus permits simultaneous work on two launch programs and reduces the interval between two launches to 1 month, while the conventional design of ELA-1, which requires performing erection, assembly and testing operations on the launcher in series at a single location, produces intervals of about 2 months between launches.

Preparation Zone

The following operations are performed on the launcher in the preparation zone of ELA-2:

-unloading and visual checking of launcher components
-erection of stages and connections
-checking of seals
-checking of engines
-preparation and assembly of liquid and solid trim jets
-checking of electrical systems.

The launcher spends approximately 1 month in this zone.

The following are the major installations in the launcher preparation zone:

positioning and connection of electrical and fluid links to the launch platform, the erection of the stages, of the systems compartment and of the trim jets and their links to the dock control panel;

-Launcher and Ground Systems Control Installations. The dock control panel from which control operations for the launcher are directed while it is in the preparation zone is installed in a building attached to the assembly dock.

Major support services for the launching facility are located in the preparation zone:

-Energy: 4,000 kilowatts installed; two emergency electricity generator systems of 440 kilowatts, and two 100 kilowatt inverters.

-Climate control: 11 systems producing 1,800 kilofrigories/hour and 600 kilocalories/hour in the form of chilled water and hot water, 1,660 cubic meters of storage in 3 tanks--2 for chilled water and 1 for hot water--allowing 4 hours of independent operation in case of power failure. These fluids are used for climate control of the premises and for cooling of the electronic systems (ground and on-board) and of the storable propellants.

-Fluids Installations: The facilities for production and storage of the conventional fluids (air, nitrogen and helium) shared by ELA-1 and ELA-2 have a storage capacity of:

-for air: 4.5 cubic meters at 200 bars
-for liquid nitrogen: 275 cubic meters
-for nitrogen gas: 40 cubic meters at 250 bars
-for helium gas: 53 cubic meters distributed according to operational needs in discrete supplies at from 200 to 350 bars.

Inventories of the propellants UDMH [unsymmetric dimethylhydrazine] and N_2O_4 (with respective capacities of 200 cubic meters) are shared and linked to the launch zones of ELA-1 and ELA-2, permitting shared use for the benefit of both facilities.

Approximately 5,000 components (gate valves, flap valves, strike valves...) and 20 km of connections, allow distribution of these fluids.

-Offices, Shops, Warehouses: An office building with 1,650 square meters of usable space on three floors connected to the launch center houses ELA-2 operations crews and launch crews.

The Launch Center is a two-level, reinforced concrete building covered with a 2-meter thick concrete slab and a 4-meter layer of soil to protect personnel and systems at the time of launch. Its work area, of 2 times 900 square meters, is divided into technical rooms, operational and observational rooms, and the shelter room. With total climate control, it is the launch-time shelter for personnel and has a capacity of 200 persons.

From the launch center, where monitoring and command systems are installed, the start up of the remote surveillance systems for the launcher, the

progression of final operational processes and the launch sequence are supervised. Two systems, the Electrical Control Command (CCE) and the Fluid Control Command (CCF), constitute the principal control systems elements.

The CCF is responsible for activation and remote control of launch systems, specifically, pressurization of reservoirs and other areas, loading of propellants, sanitation, progress of the countdown, and operation of automatic safeties.

The CCE is responsible for activation and control of electrical systems of the launcher, activation of the jettison and supply phases, use and display of data from the launcher.

The preparation zone for the launchers is linked to the launch zone by a roller path made up of a double railway 950 meters long running from the assembly dock to the launch pad. A turntable (on air cushions) and a siding allow the meeting launch platforms to pass each other.

For its transfer from the preparation zone to the launch zone, the launcher, assembled right down to the inclusion of the systems compartment, is set vertically on the mobile launch platform which moves by means of trucks on the double railway: the controlled movement of the launch platforms between the two zones is handled by a 350-horsepower tractor in less than 1 hour.

The rolling launch platform, a metal structure in the form of caissons measuring 13 by 13 by 4 meters and weighing approximately 500 metric tons, supports the jettison system for the launcher, which is identical for Ariane 3 and Ariane 4. Two launch platforms have been constructed: one for Ariane 3 launchers and one for Ariane 4 launchers.

The Ariane 3 launch platform is approximately 7 meters higher than the Ariane 4 platform to retain the same altitude for the cryogenic arms of the umbilical tower which handles the propellant, fluid and electrical links to the third stage of the launcher. The Ariane 3 platform may be converted into an Ariane 4 platform and vice versa.

Launch Zone

The following operations are performed in the launch zone:

-final phase of checking of the launcher
-erection and checking of the payload
-assembly of the nose cone
-connection of ground systems, supplying of propellants and fluids and hookup of monitoring and control systems
-preparation for launch: countdown and launch
-possible erection and dismantling of trim jets

The launcher spends approximately 2 weeks in this zone.

The principal installations of the launch zone are:

-The Launch Pad on which the mobile platform supporting the launcher is anchored. Surrounded by work platforms, the pad (12,000 metric tons of concrete) supports the launch platform, the gantry in its forward position, and is extended to form the track for withdrawing the gantry. A jet baffle, of the dry type with two slopes covered with refractory cement, integrated into the pad provides for deflecting the blasts from the first stage engines and trim jets at liftoff into two partially buried incurvate vents. Recovery and evacuation of propellants to a retention tank, in case of leaks, is provided beyond the vents.

-The Umbilical Tower, measuring 8 by 15 by 74 meters, handles electrical and fluid links between the launcher and the ground facilities; consisting of a 13-level concrete section and a 10-level metal framework and partially reinforced and protected on the launcher side, it is attached to the pad and located approximately 12 meters from the launcher; it primarily supports the cryogenic arm connections with the launcher.

-The Service Gantry protects the launcher on the pad and permits access to the various levels. Mobile, measuring 20 by 20 by 80 meters, a metal structure reinforced in its top section, weighing 3,000 metric tons, it is attached, after the launcher is transferred to the launch zone, to the umbilical tower along with which it forms a closed, air conditioned chamber in its upper half. It permits the placement onto the launcher of the payload and the nose cone or a combined payload and nose cone. The gantry section located above 62 meters is an air conditioned, pressurized, clean zone which permits final operations on the systems compartment, the payload and the nose cone before launch.

The gantry is equipped with a 32-metric-ton traveling crane with a 3.2-metric-ton rapid hoist and two 16-metric-ton cranes. The clean zone is equipped with a 12.5-metric-ton crane. An external elevator serves the launch platform and clean zone levels. The gantry is withdrawn on roller rails to a distance of about 80 meters from the launcher at launch time.

-A supply of liquid oxygen (LO_2) as well as a supply of liquid nitrogen (LN_2) and a burn-off reservoir for residual hydrogen are also installed in the launch zone.

Construction of ELA-2, successfully completed thanks to the excellent cooperation of the participating European industrials, has been spread over approximately 4 years:

2d half of 1981	End of studies and start of foundation work
1982 to 1983	Foundation work (crew of up to 450 workers) and installation of operational systems

1984	Completion of installation and trial runs and validation tests
1st half of 1985	End of validation tests and acceptance of ELA-2

The first Ariane 3 launch from ELA-2 is scheduled for the third quarter of 1985, and the first Ariane 4 launch for mid-1986.

PHOTO CAPTIONS

1. p 72. Foreground, ELA-1 with the Ariane 3 launcher ready for launch; left, the launch zone of ELA-2; background, the preparation zone of ELA-2.

2. p 73. ELA-2: launcher preparation zone, assembly dock and, on the left, the launch center.

3. p 73. Interior view of the launch center with its monitoring systems: From this center, final launcher activation procedures are performed.

4. p 74. Interior view of the assembly dock.

5. p 74. Roller path linking the ELA-2 preparation zone to the launch zone.

6. p 75. ELA-2 launch zone: the service gantry attached to the umbilical tower.

7. p 75. Service gantry: the Ariane 3 launch platform, shielded by the gantry, is visible.

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CSO: 8019/0367

AEROSPACE

HYDROGEN INJECTION VALVES BLAMED FOR ARIANE FAILURE

Paris AFP SCIENCES in French 17 Oct 85 pp 28-29

[Article: "Ariane: After the Failure of 13 September, Better Not Rush..."]

[Text] Paris--The Arianespace company will not rush and seems to prefer postponing to 1986 the two launches of the European Ariane rocket that were initially scheduled for the last two months of this year and which were jeopardized by the failure of the 15th launch on 13 September, we learned from a reliable source.

It is better to shift the timetable and to take the measures most likely to prevent the repetition of the last launch failure, and very conservative precautions rather than take risks, especially at a time when the recent failure of the U.S. shuttle and of Ariane have proved costly to insurers and when the latter are threatening to raise the premium rates once again. This is the position that the directors and managers of the European companies are explaining to their clients.

All the same, they will have to postpone the launching of four satellites: "Spot," the first French remote-sensing satellite, and "Viking," a Swedish scientific satellite, which were to travel together on 15 November, and the U.S. and Brazilian "GStar and "Brasilsat-2" telecommunications satellites scheduled for the 17th launch one month later.

Following the report of the investigation commission, which was submitted on 1 October and contained 10 recommendations, a series of corrective actions has already been implemented to reduce the risk that the hydrogen injection valve of the 3rd stage motor of the Ariane launchers will start leaking during flight, which was the cause of last month failure.

All these recommendations are technical. The first seven have to do with the valve itself and its ground testing. They are considered mandatory before authorizing the next launch. SEP [European Propulsion Company], the manufacturer of the Ariane motors, accepted them and implemented them. The last three are designed to improve the quality and analytical study of the data collected during flight.

If, during a launch, minimal defects in the range-finding data received from the rocker in flight were observed, the next launches would be postponed until a more perfect knowledge of the causes of these defects is obtained. They will not take risks. The risk is as serious for the client's satellites as for the credibility of the launcher itself, people at Arianespacesaid.

Already, the hydrogen injection valve of the 16th and 17th launchers (launches V-16 and V-17 in the expert's jargon) will be changed and replaced by others considered to be perfect. An acceptance test program for these valves has been developed, with more severe tightness criteria in simulated atmosphere. It will be implemented already with the next launch.

The observation and direct analysis of critical paramaters during one flight and their comparison with those recorded during all the previous flights, using an "Aigle" data-processing method, will make it easier to carry out a comparative overall analysis of all Ariane flights.

All this should prevent another failure. At least, everything has been done to achieve this goal.

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CSO: 3698/109

AEROSPACE

FRG EXCLUDES PARTICIPATION IN HERMES BEFORE YEAR 2000

Paris AFP SCIENCES in French 17 Oct 85 p 32

[Article: "FRG: No Participation in the Hermes project before the year 2000"]

[Text] Bonn--The Bonn government does not expect to have the funds available to participate in the French Hermes space shuttle project before the 1990's and the realization of the project before that date thus becomes more difficult, we learned on 11 October from the West German Ministry of Research and Technology.

Any commitment of Chancellor Helmut Kohl's government in favor of Hermes "is not politically defensible," at any rate not during this legislature, high ministry officials indicated. After adopting a space program providing for its participation in the European Columbus and Ariane-5 projects, last 16 January, the FRG, they added, will have exhausted all means of financing other large projects until the year 2000.

Until now, the FRG had indicated that it could not support Hermes "in the foreseeable future." Without ever ruling out a West German participation, high officials emphasized last Friday the position of their government in the perspective of the regular French-German summit of 7-8 November in Bonn. They expect the French government to bring up the matter again on this occasion.

In addition, in agreement with a commitment made last January to its ESA partners, France invited ESA member countries as well as other interested countries in Paris, on 25 October, to inform them of the progress of its preliminary work on Hermes.

The FRG's reminder of its position, according to observers, appears to be another tactical maneuver in the game of financial pressures that European countries are exerting on one another. The FRG and France both contribute, according to various apportionment keys, to the financing of the Columbus European orbital module project which should dock to the U.S. manned orbital station in the 1990's. They also contribute to the financing of the European launcher of the 1990's, Ariane 5.

France is trying to obtain financial aid from other countries to ensure that its ambitious Hermes orbital glider project will be come operational by the

end of the century; the glider would be sent into space by a launcher like Ariane 5, with a crew of 2-6 men on board, or 4.5 tons of freight. Hermes, France points out, could carry supplies to Columbus and would represent another step toward European independence in space.

Until now, 10 countries or so have shown interest for Hermes, beginning with Belgium, Switzerland and Sweden. In the FRG, high officials interviewed pointed out that Hermes alone would not be enough to acquire the independence sought, but that other elements of a prohibitive cost would be required. Finally, according to an official who wished to remain anonymous, the forthcoming French legislative elections (March 1986) could explain the French desire to obtain soon a decision on the construction of Hermes.

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CSO: 3698/109

AEROSPACE

SEP TO MAKE CERAMIC/CERAMIC COMPOSITE PARTS FOR HERMES

Paris AFP SCIENCES in French 17 Oct 85 pp 29-31

[Article: "Hermes Heat-Resistant Structures to Be Made by SEP"]

[Text] Paris--The high and ultra-high heat-resistant structures of the Hermes mini space-shuttle will be made by SEP (European Propulsion Company), the company's chief executive officer, Mr Roger Lesgards, stated on 17 October at a press lunch.

"Indeed, our company has the knowhow to make the parts required for the nose, the belly, the wing edges, the elevons (ailerons) and the fins of the future space aircraft, all parts subjected to extremely high temperatures on the way back to Earth. To this end, we have developed a new composite material made of silicon carbide ceramic/ceramic, which has the required mechanical strength and heat-resistance," Mr Lesgards added.

This material, which the SEP knows how to machine into any possible and imaginable shapes, (rounded shapes as well as double sheetmetal connected by a honeycomb structure), has proved in many tests that it can withstand temperatures of 1,400-1,600 C for 20-30 minutes: the time it takes for "reentry" into the dense atmosphere layers after a mission in space. The material will be able to withstand the mechanical and thermal stresses imposed for several hundreds of hours and tens of "returns" from space missions.

It can already be used to make parts measuring 1 x 2 m. It should make it possible to gain 1 ton on the present planned weight of the Hermes mini-shuttle. It will not be used to make a "thermal" shield for Hermes--like the one made of tiles on the U.S. space shuttles--but, quite to the contrary, it will be used to make heat-resistant structures.

"We know how to use it for easily replaceable parts. Another very interesting characteristic: its radar response is the subject of thorough studies and should open a very large market," Mr Pierre Betin, SEP assistant general manager indicated.

Such a material can be used for practically the whole heat resistant body of Hermes, and that means that these carbide silicon ceramic/ceramic materials could also be used for military and civil aircraft.

To guarantee France's supplies of this high-performance versatile material, which for the time being is obtained from Japanese-made fibers, SEP and Rhone-Poulenc should soon announce an agreement on the development of silicon carbide fibers in France. As far as machining this type of material is concerned, Mr Lesgards added, SEP is somewhat in the lead.

It must retain that lead, and this is why, based on these ceramic/ceramic materials and as part of the Eureka program for advanced technologies in Europe, SEP just proposed three "demonstrators" with European partners such as the German and Swedish engine manufacturers MAN [Augsburg-Nuernberg Machine Factory Inc.] and Volvo, the Norwegian turbine specialist Konsberg and the Italian Alfa-Romeo, plus its usual French partners--SNECMA [National Aircraft-Engine Study and Manufacturing Company], Messier-Hispano-Bugatti, etc.--to develop Diesel engines and medium and low-power turbines using this material.

The project, representing FF 500 million over 5 years, will be submitted to political officials next month in Hanover. Our German and Swedish partners have already been promised some funding from their respective governments, Mr Lesgards said.

SEP does not suffer from the failure of the 15th launch of the European Ariane rocket, on 13 September. The next launch will probably take place during the first half of January 1986, Mr Lesgards added, but a definite date will probably be announced soon by Arianespace.

SEP sales--FF 1.8 billion in 1984--will probably amount to FF 2 billion this year.

The net profit for 1985 will "exceed projections"--FF 18 million--and the orders received will probably amount to FF 3 billion (compared with FF 2.6 billion expected), one half being orders for the Ariane launchers, and FF 650 million coming from the development of, and supplies, for strategic, prestrategic and tactical missiles of the deterrent force.

The largest orders already received in 1985 totalled over FF 2 billion on 1 October, and the main items were the following:

- Ariane-4 development. . . . . FF 320
- Delivery of three Ariane-4. . . . . FF 420
- Development of and supplies for strategic and prestrategic missiles . . . . FF 510
- Supplies for tactical missiles. . . . . FF 100
- Development of a station for Pakistan . . . . FF 100

To this, the following orders will be added by the end of the year:

- Supplies for two Ariane-3 and four Ariane-4 . . . . . FF 650
- Development of the Vulcain (HM-60) engine . . . . . . FF 150

plus the orders placed this year for 9,000 engines for the Durandal missile, and 7,000 brake disks.

In the carbon/carbon sector, SEP should start testing brakes for the high-speed trains (TGV) of the SNCF (French Railroad Company)--they are already in service on an axle of a Paris-Lyons TGV car--or future European TGV. In the electronics sector, use of the magnetic bearings of the S2M [Magnetic Mechanics Company] subsidiary of SEP is making considerable progress.

After 66,000 convertible bonds were converted by SNECMA into 132,000 shares with a FF-120 face value, the company's capital is now FF 75.84 million, distributed as follows:

- SNECMA	50.14%
- Aerospatiale	14.23%
- SNPE [National Powder and Explosives Company)	8.60%
- L'Air Liquide	7.08%
- Others	19.95%

On 30 June, the SEP stockholders' equity amounted to FF 250 million.

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CSO: 3698/109

AEROSPACE

DASSAULT, AEROSPATIALE OF FRANCE TO SPLIT HERMES WORK

Financing Still Undecided

Paris AFP SCIENCES in French 24 Oct 85 pp 16-21

[Article: "Work-Sharing for the Hermes Project"]

[Excerpt] Paris--One project leader for the Hermes system as a whole: the CNES [National Center for Space Studies]; one industrial prime contractor to make the spacecraft itself: Aerospatiale; one prime contractor in charge of aeronautics: Marcel Dassault Aircraft-Breguet Aviation; such are the decisions announced on 18 March by CNES officials concerning the first industrial choices of the spacecraft project.

The decision was approved by the government, assuming that during the month that elapsed since the meeting of the CNES ad hoc commission considerations other than space considerations did not intervene concerning the two dossiers presented by the two large aerospace companies, which Mr Jacques Louis Lions, chief executive officer of the CNES said were "absolutely remarkable."

Aerospatiale, which will supervise all of the work until the actual completion of the aircraft, will therefore be responsible for assembling the components of the European mini-shuttle, as well as all that will be required for the crew's life, the mini-shuttle's trip into space (up to 3 months), its control system, etc.

Dassault is in charge of all the work required for a successful atmospheric flight (shape, heat shields, flying characteristics, overall structural design, etc.), i.e. all that is essential for the gliding flight back to earth, during which Hermes will go from Mach 25 (28,000 km/h, the orbital velocity) to a full stop.

Many points still remain to be clarified by the two French companies, forced into this marriage of convenience. Certainly, they have worked together in the past, but competition between them is constant.

Their respective responsibilities were spelled out in a contract that they both signed and concluded with the CNES, the true project leader of the whole

Hermes system, which will have the last say on everything.: the aircraft itself, the control and mission centers, the payload-preparation center, crew-training resources, launching and landing facilities, logistic means.

It is also the CNES which, in close consultation with Aerospatiale, will lead negotiations with the European partners responsible for the main subsystems that will have to be subcontracted in other countries (there would be 10 to 12). This is the only means to cover the second half of this FF 14-billion project, the first part of which, from the start, France decided to finance.

This European participation should follow the detailed presentation of the project (on 25 October in Villepinte) to representatives of 150 European companies and delegations from all European Space Agency (ESA) member countries.

Thanks to contacts already made, the first stage of the project--FF 100 million or 15 million of European accounting units--is covered 100 percent, according to Mr Frederic d'Allest, CNES chief executive and one of the leading project negotiators, who is no more worried than Mr Lions by the recent German "no, but."

French and German engineers are in full agreement, both technically and with respect to the spacecraft concept. As far as financing is concerned, "a solution will be found in the months to come," the officials pointed out.

They must ensure that the Columbus project--the manned orbital station module built by the FRG and Italy--the large Ariane-5 rocket and the Hermes project progress in concert. These projects are complementary.

They must manage to define their technical, technological and financial coherence within the ESA. They said that this would be done by the end of 1987, when the development of Hermes should be taken into account by the ESA.

To build Hermes, they will have to use their most competent people, solve aerodynamics and aerothermics problems (overheating of the belly, wings and fins of Hermes in dense atmosphere layers during reentry toward the Earth), find ways to provide on-board power supply (no fuel cells for space applications have been developed in Europe).

They will have to develop new software for the airborne electronic systems controlling all mission stages, etc. Therefore, there is plenty of work to be done, and work for all, as Mr Hubert Curien, Ariane's father and minister of research and technology, was saying a few weeks ago.

Toulouse to Become the French Houston

It is in Toulouse, in the Aerospatiale plants, that the various components of Hermes will be integrated (assembled). The decision is not yet final, but quite logical since the Aerospatiale aircraft division is located nearby.

The pink [brick] town will become the French Houston with the installation of the control and mission center, in addition to the leadership of the project itself.

Satisfaction prevailed on 18 October in Toulouse, the cradle of French aeronautics from Aeropostale to Aerospatiale, of the supersonic Concorde and of the Airbus, when it was known that the Hermes shuttle would be built here.

This decision now strengthens Toulouse's position as European pole in this respect. Because of its aeronautical tradition, its mountain facilities practically unequalled in Europe, and especially the fact that the three prime contractors, the CNES, Aerospatiale and Marcel Dsssault-Breguet Aviation, are represented here, the town was the obvious choice to set up the European space mini-shuttle, political officials and representatives of the local economy considered.

Especially since two other space manufacturers directly concerned by the program, MATRA [Mechanics, Aviation and Traction Company] and Thomson, are also located in Toulouse.

Aerodynamic Tests in Istres

The aerodynamic testing of the spacecraft, which will be launched from a carrier plane like the U.S. shuttles, will take place in Istres, where both the Aviation School--which graduated the first two French astronauts, Jean-Loup Chretien and Patrick Baudry and two of the seven new candidates to space travel, Jean-Pierre Haignere and Michel Tognini, all Air Force officers--and the Dassault Flight-Test Center are headquartered.

It is to the Istres runways that Hermes may come back after a mission in space.

Hermes: Only Four Models Built

Mr d'Allest was careful to point out that only two flight models of Hermes would be built, i.e. two spacecraft designed to fly two or three times per year at most on scientific and industrial missions, or to take crews of two to six European astronauts to orbital stations and bring them back. Should the need arise, more could obviously be built, but no assembly-line production of Hermes is contemplated.

Two more units will be made for testing, people at Aerospatiale added.

And Dassault even indicated that a quarter-scale mockup now being designed would probably be tested in space from an Ariane-4 rocket to validate the aerodynamic and heat-shield choices made. A decision in this respect should be made before the end of 1986.

This non-piloted demonstration mockup could be used in particular for subsonic landing tests from a carrier aircraft at the Istres airport (Bouches-du-Rhone), but maybe also for a "complete run" test, as its small size would enable it to fit into the satellite nosecone of an Ariane launcher and to be tested in space.

This reduced-scale model could be used to explore part of the flight envelope of Hermes, which is extremely broad (from Mach 25, i.e. 25 times the speed of sound, to some 300 km/h, the landing speed).

During the past three years, the Soviets have also tested four times in space a reduced model of their small space shuttle.

Even for the first space flight, at best in 1995, at the latest in 1997, the French will not be alone on board of Hermes, Mr d'Allest added, pointing out that Hermes ought to be a European program. We should recall that there are now 16 astronauts in Europe (9 are French, 3 German, 1 of whom is in the ESA program, 2 English, 1 Swiss and 1 Dutch; the latter 2 are in the European program).

Based on the present status of financial studies, experts estimate that the cost of each mission should not exceed 75-80 million of accounting units. "Our system is more economical to build and to operate than the U.S. shuttle," Mr d'Allest pointed out in answer to resporters' questions, and he insisted on the fact that the shuttle was not designed, for instance, to launch large satellites into space.

Subsystems Being Studied

Paris ELECTRONIQUE ACTUALITES in French 25 Oct 85 p 1

[Article by H. Pradenc: "The CNES Choses Aerospatiale as Prime Contractor for Hermes"]

[Excerpt] In concert with Aerospatiale, the CNES will carry out negotiations with European partners in the next few months to select the manufacturers that will be in charge of the main subsystems. The CNES indicated that it would take into account the specializations introduced in the European space industry by the Ariane, Spacelab and Columbus projects. As is known, the Hermes spacecraft will account for 1.3 of the 2 billion of accounting units of the complete project. The French share in carrying out the program will be 50 percent; the remainder will be distributed among at least 10 European countries. It is also known that Hermes will call for a lot of software and that its avionics will use flat-panel screens and electronic displays.

The CNES indicated that work is being done in particular on the airborne power supply, the on-board management system, robotics for the remote-controlled manipulator arm, and space rendez-vous techniques. In the latter two fields, MATRA has completed interesting studies. As for the ground-support segment, it will include in particular a control and mission center in Toulouse and a landing runway, probably in Istres. The CNES's choices concerning these aspects of the Hermes program will be finalized during 1986.

The industrial development stage that is about to start will include technological work and the preparation of a detailed definition dossier for the development of the aircraft and of the system. This is a preparatory stage for which over FF 100 million will be allocated at European level. This very day, the CNES and the ESA are to make a presentation of Hermes to European officials and manufacturers. By 1987, the Europeanization process should lead to project development within the ESA so that a first flight could take place in 1987. Under the project, two aircraft will be built.

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CSO: 3698/115

BIOTECHNOLOGY

BRIEFS

ITALIAN BIOTECHNOLOGY COMMITTEE--At the end of August, the minister of scientific research, Mr Luigi Granelli, created the National Committee for Biotechnologies in order to "encourage the definition of a true global strategy in this field, and collaboration between the scientific community and industry." The committee chairman is Minister Granelli; the vice-chairman is Prof Arturo Falaschi. The committee will have to submit its working program before 31 December 1985. [Text] [Paris BIO-LA LETTRE DES BIOTECHNOLOGIES in French Oct 85 p 2] 9294

FRENCH-JAPANESE BIOTECH LAB--A joint French-Japanese biotechnology lab could be created in Tsukuba. It would engage in R&D and in the production of proteins obtained through computer-aided design, a sector targeted by several planned actions in France as well as in Japan, Mr D. Thomas, head of the mobilization program Development of Biotechnologies at the Ministry of Research and Technology, indicated. [Text] [Paris BIO-LA LETTRE DES BIOTECHNOLOGIES in French Oct 85 p 16] 9294

CANADIAN BIOTICS LAB--The Armand Frappier Institute (Montreal) decided to engage in biotics research. One of its main goals is to develop molecular chips. Other applications are also contemplated, e.g. the development of bioprobes for the diagnostic of infectious diseases and to control fermentation processes. A biotics laboratory was just created; it is headed by Claude Hamelin, IAP [expansion unknown] researcher. [Text] [Paris BIO-LA LETTRE DES BIOTECHNOLOGIES in French Oct 85 p 16] 9294

CSO: 3698/116

COMPUTERS

DETAILS ON 'MARIE,' PART OF FRANCE'S 'MARISIS' SUPERCOMPUTER

Paris ELECTRONIQUE ACTUALITES in French 25 Oct 85 pp 1, 15

[Article by Ph. Marel: "A New Type of Supercomputer: 'Standard' Multiprocessor Microcomputers"]

> [Excerpts] The increasing power of standard microprocessors and the generous credits allocated in the United States by the DARPA [Defense Advanced Research Projects Agency] are leading to the emergence (usually in the laboratory, for the time being) of a new generation of economical and powerful supercomputers for new types of applications.
>
> In France, the Marie project (a by-product of the Marisis program) reflects this philosophy; it intends to succeed in developing a system whose price/performance ratio would be 10 times that of the Cray 1 when it was introduced.
>
> A new generation of "standard" computers should soon arrive on the market.

Research on "non-Von Neumann" architectures is in full swing in the United States, especially through projects launched by the DARPA, which are supposed to counter the Japanese "fifth-generation" projects.

An amount of $50 million was allocated in 1984 and $72 million this year, and an amount of $142 million is projected for 1986.

All together, DARPA research on supercomputers implies an investment of $1 billion until 1988, but if research on parallel processing occupies a choice position in the agency's concerns, themes like artificial intelligence and expert systems are also part of the program.

These figures should be compared with the total cost of the French Marisis supercomputer program which should be completed in 1988, thanks to an investment of FF 800 million (for research on hardware and parallel architectures only). As in the United States, this program has produced some interesting intermediate spinoffs which have led to the development of a new type of hardware using components available on the market.

The "Marie" system, which can be built around a Motorola 68000 or an NS 32032 microprocessor, will make it possible to offer a machine of 30-Mflops [millions of floating-point operations per second]--the intrinsic power of the Cray 1 when it was introduced in 1975--at a price 10 times lower.

Although the project initiators were still wondering at the beginning of this year whether it would lead to a marketable product, a decision to that effect appears to have been made since then, at the same time as an identical trend was becoming apparent in the United States and, according to some project officials, the Marie project is "strongly pursued."

The problem is that, faced with the various solutions proposed by manufacturers who are generally already well established on the scientific computing markets, it is still difficult to identify the exact markets on which to position this type of hardware. This does not seem to be a problem for the Americans, as the Department of Defense (the initiator of the DARPA program) lists a whole range of needs that are both varied and considerable.

Rather well known in France, as it just introduced its scientific and technical data-processing systems on our market, the Encore Company decided to base its developments on a bus with a very high throughput rate of 100 million 8-bit bytes per second, the Nanobus. The company is bent on interconnecting aboutten 332-bit 32032 National Semiconductor microprocessors to arrive at a machine, still in the experimental stage, capable of computing at an intrinsic speed of 15 Mips (millions of instructions per second). Similar research is also in progress at the CNET [National Center for Telecommunications Studies) using 32032 microprocessors, but they are connected to the SM Bus inside the SM 90 [Modular Structure 90].

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CSO: 3698/117

FRENCH VERY HIGH SPEED IC PROGRAM FOR MILITARY APPLICATIONS

Paris ELECTRONIQUE in French Sep 85 pp 39-40

[Article: "Military Program on High-Speed Circuits in France"]

[Text] For the radars of future fighter aircraft, for the radiocommunication systems of the next decade, etc., French defense equipment manufacturers need new components, faster integrated circuits than those that exist today, to achieve higher-frequency processing of video, radar or radio signals.

Equipment manufacturers, system experts and silicon founders, specialists of integrated circuits, have entered into a partnership with the French government and set up a development program for high-speed integrated circuits, the CITGV [High-Speed Processing Integrated Circuits] program, the equivalent of the VHSIC program on a French scale.

Two working groups are in charge of developing these circuits. The one in charge of bipolar integrated circuits is the GTTS--Signal-Processing Working Group; the second, for MOS, is the GETS--Signal-Processing Study Group. Both groups consist of equipment manufacturers who design circuits and a "silicon founder" (Thomson Semiconductors) which provides design rules, develops cell and function libraries and is responsible for circuit production.

High-Speed Bipolar Circuits

The goal of the first program is to develop high-speed bipolar circuits. The program was proposed by various Thomson-CSF units and approved by the General Delegation to Armament [DGA]. It is followed by the Signal-Processing Working Group, GTTS.

The goal of that program is to develop, by 1988, four main circuits that could be used in future radar systems: an FFT operator ("fast Fourier transformer"), a systolic filter, and SIMD and MIMD ("single and multiple instruction, multiple data") processors. Simultaneously, a library of standard cells for custom circuits will be set up so that applications of this program will be available for other circuits.
The goal of stage 1 of the program is to obtain, late in 1986 or early in 1987, HBIP-3 [expansion unknown]-technology circuits with 2-micron lines,

capable of placing 3,000 to 5,000 bipolar logic gates on a 1-cm^2 silicon chip. The characteristicccs of this technology, using STL logic ("Schottky transistor logic"), chosen because it offers a good speed/consumption compromise, are a 2-ns propagation time and a 200-microwatt consumption per logic gate.

Stage 2 of the program is still more ambitious. It provides for placing 25,000 to 30,000 logic gates with 1.25-micron lines on the same 1-cm^2 chip; the characteristics aimed at are 1 ns and 150 microwatt. These performance characteristics are for the whole range of military specifications, from -55C to +125C.

High-Speed CMOS Circuits

A parallel program, the CMOS high-speed program, was started by the DGA. The working group associates manufacturers such as Thomson-CSF and several other French equipment manufacturers to a silicon founder, Thomson Semiconductors, whose mission it is to provide design rules and ensure circuit production.

Stage 1 provides that sample circuits in HCMOS-2.2 technology, with two metal layers and 2-micron lines will be supplied in 1986. Stage 2, which will follow, will see the development of HCMOS-3 technology with 1.25-micron lines.

These circuits will be so complex that they could amount to 600,000 to 1 million transistors on a 1-cm^2 chip.

In addition, the high-speed processing integrated-circuit program provides for the creation of a library of macrofunctions and standard signal-processing cells which, in this case too, could be used to design other types of circuits.

Tests and Packages

Besides the high-speed processing integrated-circuit program proper, i.e. technological-process development and circuit design, but in close collaboration with it, two associated programs are contemplated.

The first one covers probe tests ["tests sous pointes"] and the final testing, after encapsulation, of high-speed MOS and bipolar VLSI circuits. The second aims at developing encapsulation in "pin-grid array" and "chip-carrier" packages with over 200 pinouts.

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CSO: 3698/140

DEFENSE INDUSTRIES

BRIEFS

MILITARY ELECTRONICS AT CIMSA-SINTRA--A joint operational structure will soon be implemented at the Thomson Company under the name CIMSA-SINTRA [Military Space and Aeronautical Data-Processing Company/New Radioelectrical Technology and French Electronics Industrial Company]; it will pool the resources of the two companies which are highly complementary in the field of data-processing equipment, data-processing systems and integrated military-communications networks. Last March, Mr Jean-Robert Martin was appointed head of these two subsidiaries of the nationalized group in order to prepare their regrouping.In a first stage, the rapprochement will result in SINTRA's leasing and managing CIMSA; SINTRA is quoted on the Paris stock exchange and will take the name of CIMSA-SINTRA. The new group will rely on two major poles of activity. On the one hand, processing and display hardware and, on the other hand, the design and implementation of large data-processing systems for military applications (aid to command, communication networks), security applications and industrial-process control, especially in severe environments. The group will also benefit from the knowhow of the two companies in advanced technological sectors (software engineering and advanced languages, flat-panel screens, hybrid microcircuits, use of ceramic substrates, etc.). CIMSA-SINTRA will have four industrial facilities: Velizy and Colombes in the Paris area, Marcq-en-Baroeul near Lille, and Toulouse, with a personnel of over 4,000. It will represent one of the largest European poles in the field of data-processing equipment, military and civil data-processing systems and integrated military-communication networks. In comparable terms, the CIMSA-SINTRA group achieved sales of FF 2.35 billion in 1984. As is known, in December 1983 Thomson had bought the 70 percent of SINTRA's capital that were held by CGE [General Electricity Company]; after a takeover bid it now controls 97 percent of SINTRA's capital. [Text] [Paris ELECTRONIQUE ACTUALITES in French 25 Oct 85 p 11] 9294

CSO: 3698/116

FACTORY AUTOMATION

BRIEFS

EUREKA ROBOTICS PROJECT--Five European companies--two from France (the Atomic Energy Commission [CEA] and MATRA [Mechanics, Aviation and Traction Company]), one from Spain (CASA, Aeronautical Engineering Company), one from Germany (Dornier) and one from Switzerland (CSEM, Swiss Center for Electronics and Microtechnology)--are going to cooperate in robotics under the Eureka program. The CEA and MATRA announced this "proposal for action" whose theme is "third-generation" robotics in a joint communique published on 17 October in Paris. This partnership is "very important for the development of robotics and computer-integrated manufacturing" and might have "considerable spinoffs" in transport-related fields such as "aid to driving and navigating non-piloted vehicles," the communique pointed out. The goal of this research will be to achieve autonomy of decision and movement for civil-security robots used in firefighting, lifesaving, emergency situations, etc. [Text] [Paris AFP SCIENCES in French 24 Oct 85 p 5] 9294

CSO: 3698/117

MICROELECTRONICS

BULL OF FRANCE SETS SALES, COMPUTER STRATEGY

More Business Abroad

Paris ELECTRONIQUE ACTUALITES in French 18 Oct 85 p 12

[Article by Ph. Marel: "Bull Wants to Achieve 50 Percent of Its Sales Abroad by 1990"]

> [Excerpt] "Bull intends to achieve 50 percent of its sales on export markets at the latest by 1990": through this statement, made at the second Bull-SSII [data-processing service and engineering companies] symposium which was held in Paris last week, Francis Lorentz disclosed one of the objectives of the company's second operating plan, still in preparation, which covers the period 1986-1990.

These objectives "express the group's determination to become a major actor in the data-processing industry by the end of the decade," the chief executive officer was to add in substance and, although a breakdown of Bull's sales shows that only 36 percent of its current sales are export sales, special efforts will be undertaken to conquer market shares abroad.

Mr Lorentz then defined three essential lines of action to achieve these objectives.

First, the group intends to strengthen its network of alliances, under agreements signed with NEC [Nippon Electronic Company] and Honeywell, at European level and in the field of telephony.

However, gaining market shares abroad also means making investments, in particular like those made in France in services, support and sectorial solutions.

Finally, a special effort will be made with respect to small and medium-size businesses and industries, "an area in which Bull has the best chances to achieve rapid penetration in other European countries," Francis Lorentz explained, and which "becomes a priority orientation" thanks to the DPS-7 lines for business communications and to the SPS lines for scientific, technical and computer-integrated manufacturing applications.

However, what underlies this undertaking--and Francis Lorentz had an ulterior motive when he chose the Bull-SSII symposium to make these statements -- was the group's need to strengthen its cooperation with service companies at international level. A policy similar to that undertaken in France during the past year--which materialized in particular through the publication of the "Bull-SSII charter"--designed to clarify the nature of relations between the manufacturer and its outside partners, will be implemented abroad. This charter includes a policy of aiding investments by making development hardware available to service companies at special conditions, which could result in price reductions of 40 percent, by training 2,500 auditors from these companies in one year, or again by integrating SSII project leaders into Bull teams.

Computers Compatible With IBM

Paris AFP SCIENCES in French 17 Oct 85 p 50

[Article: "Bull Intensifies Its Strategy of IBM Compatibility"]

[Text] Paris-- Bull, the leading French computer manufacturer, decided to intensify its strategy of IBM compatibility in the field of micro-computers by introducting Ajax, a model derived from the IBM AT micro-computer, before the end of the year, we learned from industrial sources Monday in Paris.

The nationalized group thus demonstrated its ability to catch up in the field of micro-computers, industrial circles pointed out. Bull's first IBM compatible, the Micral-30, was introduced early in 1985, i.e. 3 years after the IBM PC, whereas Bull's AT version arrives 1 year only after the original model and practically at the same time as compatible models from large U.S. manufacturers such as Zenith, NCR, Sperry, Hewlett-Packard or ITT.

Bull's model, code-named "Ajax," could be available around November for computer companies wishing to market it under their own brand name, and around March 1986 under the Bull label, the trade weekly ELECTRONIQUE ACTUALITES indicated.

This micro would have practically the same characteristics as the IBM AT (an Intel 80286 microprocessor, 512 K of memory, advanced graphics) but with a few additional advantages: a connection to Bull computers, a chip-card reader to provide security of access, a larger memory, and it would probably cost 10 percent less (FF 40,000 or so for the AT).

Bull will manufacture most of its micros at its automated Villeneuve-d'Ascq (Nord) factory, which will become operational during the first quarter of 1986, while the mother board (the machine core) will probably be subcontracted to a French company.

The nationalized group will have sold 30,000 Micral-30 in 1985, so that it ranks first in France, and at a level comparable with that of groups like Texas Instruments or ITT.

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CSO: 3698/112

MICROELECTRONICS

SIEMENS PRODUCES FIRST LED TO EMIT IN BLUE

Paris INDUSTRIES ET TECHNIQUES in French 20 Oct 85 p87

[Article by Philippe Le Coeur: "Optoelectronics: Light-Emitting Diodes Emitting in Blue"]

> [Text] We were all waiting for them. These LEDs [light-emitting diodes] emit at 480 nm for a forward voltage of 4 volts. Their brightness and angle of emission are still limited compared to their green, yellow and red counterparts.

For over a decade, semiconductor crystals such as gallium, phosphorus or arsenic have been emitting in red, green and yellow. But not in blue! It is not that no one tried, but the attempts made never went farther than research in the lab. With the introduction of an LED of that color, Siemens is drastically changing the situation. The new component, called SLB 5410, uses silicon carbide as a basic material. After a lot or research, it was preferred to its competitors, zinc selenide or gallium nitride, and judged to be the optimum semiconductor crystal for that color. It emits at a wavelength of 480 nm. For this radiation, the diode requires a forward voltage of 4 volts (20 mA), compared with a typical value of 10 volts (20 mA) for ZnSe and GaN. When it comes to consumption, every little savings help! In addition to a high pulse load, a narrow spectral passband and a very low rate of ageing, it offers the purity and reproducibility of blue radiation at 480 nm which, according to the German technicians, are unequalled to date. On the other hand, compared with traditional LEDs, this diode offers limited brightness and angle of emission. Siemens mentioned figures of 4 millicandela (20 mA) along the optical axis, for a half-angle of 8 degrees.

This component will find many applications as a radiation source in spectroscopy, biophysics or medicine. Calibrated light sources for television cameras and photography as well as flat-panel screens will also find advantages in this new light-emitting diode.

The introduction of this component was possible because Siemens possesses the appropriate manufacturing process: in a word, a facility to produce blue-light emitting chips at a price deemed "attractive" by the German company, but which does not yet match the price of red, green or yellow LEDs.

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CSO: 3698/117

MICROELECTRONICS

BRIEFS

SGS SINGAPORE SEMICONDUCTOR FACTORY--SGS [expansion unknown] inaugurated a second production unit in Singapore, costing $50 million and with an annual capacity of one half-billion chips. This factory, which will design and process 125-mm semiconductor wafers, is considered to be the most advanced in the South Pacific area. The factory structure is insensitive to vibrations, to within 1 micron. [Text] [Aarau ELECTRONIQUE in French Jun 85 p 11] 9294

CSO: 3698/112

SCIENTIFIC AND INDUSTRIAL POLICY

FRENCH SENATE REPORT: ELECTRONICS NATIONALIZATIONS ARE 'ERROR'

Paris ELECTRONIQUE ACTUALITES in French 18 Oct 85 p 3

[Article: "Wishing to Put Them Into Private Hands, a Senate Report Judges State-Owned Electronic Groups Poorly Adapted to the Market Evolution"]

[Text] Dangerous, anachronistic, archaic, these are some of the adjectives used in a recent Senate report on the industrial nationalizations made in 1982, in particular on those of CGE [General Electricity Company], Thomson, CGCT [General Telephone Engineering Company], Bull and MATRA [Mechanics, Aviation and Traction Company].

The report published a few days ago was prepared by the Senate standing committee for study and information on nationalized companies, with Mr Maurice Blin as general reporter.

In brief, we can say that the report sees two equally condemnable logics in the government's policy toward these various groups of our sector: a "logic of the arsenal" on the one hand and, on the other hand, a logic judged "narrow-mindedly focussed on France."

According to the Senate, the nationalized electronics and data-processing groups are handicapped, on markets changing at a fast pace, by their very status of state-owned companies: in a word, according to the report, they are too unwieldy in a rapidly changing universe.

The report also estimates that, at a time when technologies are converging, it was a mistake to try and specialize each group according to its trade.

To right the helm, the Senate proposes essentially two solutions: putting the groups into private hands and deregulating them.

Referring to the nationalized electronics sector, the report judges that the industrial policy implemented since 1981 is dangerous: "Indeed, it confuses

the necessary mobilization of national resources in favor of sectors with a promising future with the application of archaic ways of thinking proceeding from a logic narrow-mindedly focussed on France."

"Running counter to the convergence of technologies," the report explained, "the government has advocated the specialization of public groups by trades, although, in the light of market requirements, the latter are trying to get out of the initial pattern."

"Facing a shift of the demand toward private or deregulated markets, a single national offer was preferred, which is truly valid only in negotiations between states. Thus, the French offer in the field of telecommunications appears to be decidedly ill-suited to the market evolution: the United States represented only 4.4 percent of our market in 1983, compared with 69.5 percent for developing or newly industrialized countries. But in 1988 the U.S. market alone will account for 40 percent of the world market, compared with only 14 percent for the second group of countries."

"Finally, shifting international strategic alliances were met essentially with French-centered regroupings, and some of these also broke previously concluded alliances at European level. French companies. however, try to be actively represented in the various European research projects initiated by the governments of member countries and by the commission, such as the ESPRIT [European Strategic Program for R&D in Information Technology] and RACE [R&D in Advanced Communication Technologies for Europe] programs or again the Eureka project, and more generally in all forums likely to promote international standards and specifications in the fields of data processing and communications."

The report judges that nationalized electronics groups are suffering from "an extremely serious handicap," as they are "excluded" from large alliances between international groups which, the reporters note, have multiplied in the past three years. The report estimates that the choices that were made are a cause "for serious concern." "Indeed," the study explains, "priority was given to the creation of enterprises with a monopolistic and national orientation at a time when multinational groups geared to the whole planet are being created throughout the world." In addition, this "logic of the arsenal" does not really answer the market explosion and the accelerated miniaturization of products.

"Certainly, considering the latent Colbertism which characterizes the French economic tradition, we can understand that the temptation was strong to privilege once again relations between states through nationalized companies at the expense of relations with a rapidly changing world market on which the demand from the private sector keeps increasing. But, precisely, it was not necessary to yield to that temptation."

"The results of this anachronistic wager can already be seen. The leading public companies in the sector have until now failed in their attempts to ally themselves with foreign groups that would have given them the international

dimension they need to survive; today like yesterday, they are still excessively dependent on military orders and on contracts signed in developing countries, i.e. financially very shaky."

"This orientation is all the more alarming as, with time, it will become increasingly difficult--or even impossible--to straighten it out."

The report estimates that the situation of nationalized groups in our sector "will not improve as long as the contradiction between the unwieldiness and constraints of their status as state-owned companies and the truly staggering development of the markets and technologies with which they must keep pace if they are not to decline is not removed."

Our readers therefore understand that, for the Senate, the solution is to put these groups into private hands and deregulate them. All modern countries have understood it, the Senate stated, "while on the contrary third-world countries as a whole are collapsing under the weight of public sectors in decay..."

Speaking of CGE, the reporter also noted: "Its long familiarity with the administration, resulting from the multiple interfaces that public contracts represent, probably explains that, for CGE, nationalization was an episode rather than a trauma."

"With the benefit of a satisfactory financial position that was in singular contrast with the serious problems confronting other public groups, CGE also retained most of its management team around its general director who became president of the company in July 1984."

"All these factors enabled CGE to forestall any untimely intervention of the supervising authorities."

"Better still, knowing that, being nationalized, it could claim to represent the public interest, after 1981 CGE found itself in a strong position to promote a corporate strategy that is actually rooted in its history."

Mentioning elsewhere the regrouping of Thomson's and CGE's telecommunications operations, the report states: "The creation of a national near-monopoly in the field of telecommunications, on account of the necessity to put an end to French-French competition, always called fratricidal, is a particularly daring wager."

"Indeed, the first consequence of the agreement between CGE and Thomson was to disorganize the marketing networks of the two companies, whose angles of attack were not the same, and to confuse customers, now faced with the uncertainty which hung over the product line of the new group."

"In the long run, this agreement could have very serious consequences."

"We run the risk that CGE, now assured of the national market, may progressively lose its international competitiveness and its technological expertise."

"The CGE-Thomson merger has correspondingly reduced the possibility of alliances with foreign partners, even in the field of telecommunications or in the complementary field of data processing.

"At a time when French public groups are devoting their energy to digesting the effects of their mergers, foreign groups are forming vast networks of alliances and synergism from which our country is conspicuously absent."

"Finally, the existence of a single national offer, which is certainly attractive in the context of negotiations between states, on the one hand ignores the present trend to deregulation which progressively frees these markets from any political decision-making process and, on the other hand, fails to take into account the technological evolution that is giving increasing weight to the private clientele of corporations."

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CSO: 3698/110

SCIENTIFIC AND INDUSTRIAL POLICY

OVERVIEW OF PROJECTED FRENCH PARTICIPATION IN EUREKA

Paris EUREKA: LA RENAISSANCE TECHNOLOGIQUE DE L'EUROPE in French Jun 85

[Official document of the French Republic; typed version published by CESTA [Center for Studies on Advanced Systems and Technologies]; 77 pages, not numbered]

[Text] Paris, 27 June 1985

It is now two months since the EUREKA program was launched.

The first results are already considerable. Witness the agreements already signed in the fields of data processing and computer-integrated manufacturing or electronic components by the following manufacturers:

- MATRA [Mechanics, Aviation and Traction Company] and Norsk Data, on compact vector computers;

- Bull and Siemens, on large digital computers;

- GEC [General Electric Company], Philips, Siemens and Thomson, on advanced microprocessors, gallium arsenide integrated circuits, microwave components, high-density memories, flat-panel screens, and all kinds of sensors;

- Aerospatiale and MBB [Messerschmidt-Boelkow-Blohm], on technologies of the future in their fields of expertise.

Other negotiations are in progress; we are confident that they will materialize in the near future.

The working document attached, based on the work of a group of experts from industrial and research circles, aims at providing information on projects already finalized.

The industrial enterprises and research centers mentioned are likely to be interested in such projects.

Obviously, however, all industrial enterprises and research centers concerned must indicate their desire to associate and regroup themselves according to flexible formulas and variable configurations.

In addition, the first options selected represent "beacons" in the universe of high technologies; however, other projects could be explored profitably.

In the weeks and months to come, we shall have to continue our work in common in order to build progressively the Europe of high technologies.

The minister of foreign relations,
Roland Dumas

The minister of research and technology,
Hubert Curien

[Introduction]

In view of the considerable efforts made in the United States and in Japan, Europe--if it is to meet the technological challenges of the end of this century--must hasten to acquire the knowhow which, tomorrow, will be at the heart of the third industrial revolution. It must hasten to choose between options that will lead either to decadence or to the technological Renaissance of Europe.

In this respect, the next 15 years before the year 2000 will be decisive.

But we already know where to direct the bulk of our effort: information technologies, production technologies and the technologies of vegetal and living resources represent in fact the hard core of the knowledge and talents that will open to us the doors of the third millenium.

These techniques form a coherent whole, an original architecture whose components are computers and software, robots and "flexible" manufacturing plants, lasers and new materials, communications and transports, and finally the biotechnologies.

Our future hangs on the consolidation and strengthening of this knowledge and knowhow. They will condition our ability to renovate working conditions, renew human relations, remodel training, health and leisures... In a word, we must master these technologies to ensure our autonomy of decision and our independence.

This is why we must mobilize European energies and abilities on well-defined objectives and programs with clear goals. Five fields are decisive: data processing, telecommunications, robotics, materials and biotechnologies. Together, we must explore the frontiers of knowledge in these fields and master their practical applications.

The technological Renaissance of Europe will first require expertise in the technologies of information, production and vegetal and living resources.

Information technologies, which can be used in a multitude of fields by means of components and software, will open wide the road to the progress that will affect all other sectors of activity.

Components will be the "basic pawns" available to human ingenuity which will transform them into a variety of products and a multiplicity of services: artificial intelligence and expert systems will mobilize knowledge and, in time, make it more accessible. We shall have to analyze better and understand zetter, the better to transmit and communicate. Supercomputers, finally, will help us better manage organizations and better predict the evolution of natural systems, from meteorology to social security.

Tomorrow, the fate of our societies will largely depend on human communications. In this case, technology is bearing huge promises: voice, data, image transmission. Universities without walls and telecommuting. These are innovations of all kinds that will be made possible by a vast range of communication tools.

Then, production technologies, in the form of flexible and automated factories, will form the basis of new industrial forms. Instruments of negotiation between social groups, they will be the source of a veritable industrial renaissance. As for robots, beign mobile they will give us access to hostile worlds: ocean deeps, high pressures, extreme cold, space. They will also free us from dangerous and insalubrious work.

Finally, mastering the technologies of vegetal and living resources is crucial, as our food, our health, the revitalization of zones that are now desert depend on improved control and implementation of these technologies. Biotechnologies offer us solutions to develop and enrich our agricultural resources. Artificial seeds are thus signalling the dawn of a new agriculture.

Dominating the new era of information means:

First of all, designing and producing basic components, the indispensable elements of any automated system: microprocessors and memories. The "europrocessor" is at the heart of the Europe of the future.

1. Developing large-capacity computers;

2. Creating tools to design and develop artificial intelligence and expert systems;

3. Developing artificial organs to endow our automated systems with sight, hearing and touch.

Dominating the new era of communication means:

1. Establishing an optic communication network that will transport voice, data and image communications at low cost;

Yesterday, among Europeans, we were able to master the stakes of energy and space. Our particle accelerators, our fusion and breeder machines, our aircraft, our space launchers, our satellites prove that we have already gone a long way. We must now work together on the key technologies of information, production and life.

Five programs materialize our determination to act: Euromatique, Eurobot, Eurocom, Eurobio, Euromat.

The minister of foreign relations,
Roland Dumas

The minister of research and technology,
Hubert Curien

5 Priority Goal-Oriented Programs

- Euromatique	Large computers Parallel architectures Artificial intelligence and expert systems High-speed silicon AsGa
- Eurobot	Third-generation robotics Automated factory, computer-aided design and manufacturing Lasers
- Eurocom	Research network Wideband-network equipment
- Eurobio	Artificial seeds Biomedical engineering
- Euromat	Ceramics turbine

This document is a synthesis of the work of expert groups from the industry and from the administration, organized in the context of the Eureka program. It presents a set of well-defined projects meeting the program's criteria. Other projects are still in the study stage and, they too, may be the subject of agreements.

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- European custom circuit plant

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- Multilingual information system
- Control and monitoring of major industrial processes

Eurobots
- Civil-security robots
- Agricultural robot
- Flexible and automated factory for highly-integrated manufacturing
- CO_2, CO, excimer and free-electron lasers

Eurocom
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Eurobio
- Artificial seeds
- Alternate fuel

Small and Medium-Size Industries in Eureka

[I] Euromatique: Large Computers, Parallel Architectures, Artificial Intelligence and Expert Systems, High-Speed Silicon, GaAs

- Large vector computer
- Highly parallel computer architectures
- Synchronous-architecture multiprocessor machine
- Mass memory
- Software engineering center
- Dedicated circuits and line of symbolic machines
- Generalized tools for expert-system applications development
- Multilingual information system
- Control and monitoring of major industrial processes
- Europrocessor
- 64-megabit memory
- European GaAs-circuit plant
- European custom-circuit plant

Digital Computers - Parallel Architecture

- Large vector computer

Development of a 30-Gigaflops digital supercomputer by 1992 to carry out the simulations required to design complex systems (scientifique laboratories, aeronautics and automobile industries, meteorology, etc).

- Highly-parallel computer architectures

Development of a highly-parallel machine with a power in excess of 10 gigaflops by 1992.

- Synchronous-architecture multiprocesor machine

Development of a multiprocessor synchronous-architecture machine by 1992, for numerical analysis, signal and image processing.

- Mass memory

Development of large high-capacity storage disks for business-oriented and scientific large or medium-scale computers.

Software Engineering

- Software Engineering Center

Creation of a European software engineering center to coordinate R&D, dissemination and information operators.

Artificial Intelligence - Expert Systems

- Dedicated circuits and line of symbolic machines

Development, over 10 years, of a symbolic processor family (maximum power: 1 gigalips) and of the associated software for multiple applications in avionics, astronics or in the field of large industrial production units.

- Generalized tools for expert-system applications development

Research and development of tools for the development of expert systems and expert-system models.

- Multilingual information system

Natural-language querying and updating of databases that may contain text, graphic, image and voice data, with data-entry and operation in several languages.

- Control and monitoring of major industrial processes

Development, by 1990, of aids to process control integrating diagnostics, projections, decision-making and action follow-up.

Electronic Components

- Europrocessor

Development of a high-end flexible microprocessor in submicronic technology for the next decade; it should lead to the introduction of a standard.

- 64-megabit memory

Progressive development of memories of up to 64 megabits by 1995, with possible applications to other electronic components.

- European GaAs-circuit plant

Industrial development of high-speed GaAs components for civil applications and completion of a pilot plant within 5 years.

- European custom-circuit plant

Creation of a European technique-validation plant to be used also as a higher-training tool.

Eureka
Theme: Euromatique
Project Sheet: Large Vector Computer

[A] Description

Nature

Development of a very high-power vector machine.

Specific Interest

This type of machine has become a must to achieve the numeric simulations required for complex-system design.

Spinoffs

- Acquisition of knowhow by the industrial teams working on the project (hardware and software);

- Technological spinoffs as far as the high-speed and integrated electronic components required to make the hardware are concerned;

- European dependence on the United States and Japan, which is now absolute, will be reduced.

Basic Technologies Involved

- Computer architectures;
- Microelectronics;
- Networks;
- Computer-aided design.

Working Schedule Contemplated

- Objective

Development of a machine with the following characteristics:
- Peak power: 30 Gflops (3.10^{10} floating-point operations per second);
- Memory: one 64-bit Gword;
- Technologies: . operators: ECL [emitter-coupled logic]
  . registers: GaAs
  . memories: MOS [metal-oxide semiconductor]
- High-level languages: Fortran, Ada, C, etc.
- Tools for running associated programs in parallel.

- Working schedule

- 1986	Preliminary study
- 1986-1988	Technological studies
- 1987-1988	Study
- 1989-1991	Development of two prototpyes; software
- 1992	Integration.

Launching Procedure - Management

Launching of a preliminary feasibility study and of technological studies with competent organizations in 1986 (decision late in 1985).

Depending on the results of these preliminary studies, decision to continue the definition studies of the machine and its software in 1987 and 1988 (decision late in 1986).

Decision to start the development of two prototypes late in 1988 (time required: 3 years).

To manage the project, creation of a Managing Committee (one co-manager to be appointed in each country) assisted by a technical working group of representatives of government departments, manufacturers and users from the countries concerned.

Creation of an industrial and financial entity.

[B] Possible Partners in France

- Manufacturers

Main partner: Bull
Possible cooperation from: Thomson, SINTRA [Industrial Company for New Radioelectrical Technologies and French Electronics]

- Public Organizations

ONERA [National Office for Space Studies and Research], INRIA [National Institute of Data-Processing and Automation Research]

[C] Possible Partners in Europe

- FRG: Siemens, etc.

[D] Benefits Derived From European Cooperation

- Opening new markets

- Contributions from experts, in particular in architecture and technology.

Eureka
Theme: Euromatique
Project Sheet: Highly-Parallel Computer Architectures

[A] Description

Nature

- Study of highly-parallel architectures
- Development of a machine.

Specific Interest

Highly-parallel architectures are a way of developing the supercomputers of the 1990's. They should lead to moderate-cost high-performance systems.

Spinoffs

Acquisition of knowhow in the field of high-performance computer-system architectures.

Basic Technologies Involved

- Supercomputer architecture
- Microelectronics
- Networks

Working Schedule Contemplated

- Objective

Development of a machine exceeding 10 Gflops by 1992.

- Working schedule

The project consists of two stages:

Stage 1: Study of an architecture leading to the development of a demonstration machine (power: 100 Mflops) by 1988. The goal is to demonstrate that this type of architecture can provide high performance over a broad range of applications.

Stage 2: Development of a highly-parallel machine (power in excess of 10 Gflops) by 1992.

The following points will be studied:
- Design and emulation tools for parallel architectures;
- Hardware and software control mechanisms;
- Programming tools;
- Development of specific numeric algorithms;
- Parallel memories;
- Communications between processors;
- Processor design;
- Technology.

Launching Procedure - Management

- Study stage to start already at the end of 1985;
- Decision to start stage 2 (development) early in 1988;
- As far as project management is concerned, the committee and technical group set up as part of the "Large Vector Computer" project may also monitor the "Highly-Parallel Architectures" project.

[B] Possible Partners in France

- Manufacturers

Bull, Thomson/SINTRA, etc.

- Public Organizations

CNRS [National Center for Scientific Research], INRIA, ONERA, etc.

[C] Possible Partners in Europe

In the first "study" stage, the broadest participation of European organizations is desirable.

The INRIA and the GMD [expansion unknown] (FRG) are already cooperating on the subject. Their cooperation could form the core of a European team enlarged to include other partners (e.g. Great-Britain, Italy).

[D] Benefits Derived From European Cooperation

Contribution of foreign expertise, especially with respect to parallel algorithms and vectorization, and also computer architectures.

Eureka
Theme: Euromatique
Project Sheet: Synchronous-Architecture Multiprocessor Machine

[A] Description

Nature

Development of a synchronous-architecture multiprocessor machine.

Specific Interest

This type of machine is required for:
- numeric analysis;
- signal processing;
- image processing.

Spinoffs

- Acquisition of knowhow by the industrial and public organizations working on the project (hardware and software);

- Contribution to the development of high-integration HCMOS [expansion unknown] circuit technologies and assembly technologies that could be used in the data-processing sector as a whole;

- Competitiveness on the market of high-power low-cost scientific-application computers.

Basic Technologies Involved

- Computer architectures;
- Microelectronics;
- Networks;
- Computer-aided design.

Working Schedule Contemplated

- Objective

- Peak power of about 2,000 megaflops (2.10^9 floating-point operations over 32 bits; $1.10.^9$ over 64 bits), for the best performance ratio (overall dimensions, dissipation/power).
- Memory of 100 32-bit megawords;
- Technology: HCMOS or AsGa operators; MOS memory;
- High -level languages: Fortran, Ada, etc.;
- CAD tools.

- Working schedule

- Study of machine parallelism;
- VLSI technological development, especially in HCMOS, for:

- Interconnection network;
- High-speed memory-processor link;
- Processing units.
- Improved assembly technologies:
    - Packages with a large I/O number;
    - High-density printed circuits.
- Languages and translation chains with automatic extraction of parallelism.

Launching Procedure - Management

Preliminary study and technological studies with competent organizations to start in 1986 (decision late in 1985).

Depending on the results of these preliminary studies, decision to proceed with the definition of the machine and its software in 1987 and 1988.

Decision to start development of a prototype around mid-1988 (time required: 2 years).

To manage the project, constitution of a Management Committee (one co-manager appointed in each country) assisted by a technical working group of representatives of government departments, manufacturers and users from the countries concerned.

[B] Possible Partners in France

- Manufacturers

- main partner: SINTRA (Thomson group);
- with the cooperation of: Thomson-Semiconductors, etc.

- Public Organizations

INRIA/IRISA [Data-Processing and Random-Systems Research Institute] (study of parallel architectures, tranlators), LASSY [expansion unknown] (CNRS laboratory in Nice), etc.

[C] Possible Partners in Europe

- Manufacturers represented on the data-processing market and with advanced knowhow in VLSI design (HCMOS process) and high-integration assembly technologies (INMOS [expansion unknown], GEC [General Electricity Company], Siemens, etc.).

- Research organizations competent in the fields of parallel architectures, parallel languages and associated translators (GMD, etc.).

[D] Benefits Derived From European Cooperation

- Expansion of the technical base of the project and improved technological level;
- Possibility of broader marketing.

Eureka
Theme: Euromatique
Project Sheet: Mass Memory

[A] Description

Nature

Study and development of large magnetic disks and, subsequently, large optic disks and their controllers.

Specific Interest

New very-large-capacity storage methods representing one subsystem essential to the operation of medium or large-scale business and scientific computers.

Spinoffs

Development of a European industry to counterbalance the international U.S. monopoly.

Basic Technologies Involved

Mastery of numerous technologies:
- Precision engineering;
- Aerodynamics;
- Magnetics;
- Chemical metallurgy;
- Optics;
- Magneto-optics.

Working Schedule Contemplated

- Objective
Development of large-capacity storage means by 1990.

Launching Procedure - Management

Creation of an industrial and financial consortium.

[B] Possible Partners in France

- Manufacturers

Bull, etc.

- Public Organizations

LETI [Electronics and Data-Processing Technology Laboratory], etc.

[C] Possible Partners in Europe

- FRG: BASF [Baden Anilin and Soda Factory], Siemens, etc.

[D] Benefits Derived From European Cooperation

- Pooling resources no single manufacturer could gather.
- Pooling scattered capital concerning magnetics, disks, recordings, etc.

Eureka
Theme: Euromatique
Project Sheet: Software Engineering Center

[A] Description

Nature

Creation of a software engineering center.

Specific Interest

- Coordination of R&D in software engineering;
- Dissemination of research results;
- Collection and reduction of data on software development.

Spinoffs

- Preparation of utilization standards for software-engineering technologies.

Basic Technologies Involved

Software engineering:
- methods;
- techniques;
- tools;
- plants, etc.

Working Schedule Contemplated

- Objective
Setting up the center.

- Working schedule

- Identifying the Center's objectives, major research fields, implementation stages;
- Setting up the observatory [as published] in the very near future;
- Starting R&D work;
- Progressive standardization of methods, techniques, tools, languages, documentation interfaces, etc.
- Collecting data from manufacturers;
- Developing corresponding means of analysis.

[B] Possible Partners in France

- Manufacturers

Aerospatiale, Bull, Cap Gemini, Renault, SSII [software engineering companies], etc.

- Public Organizations

INRIA, Saint-Etienne School of Mines, etc.

[C] Possible Partners in Europe

- Great-Britain: ICL [International Computer Limited], Logica, Scicon, etc.
- Netherlands: Philips, etc.
- FRG: AEG [General Electric Company], Dornier, MBB, Siemens, Aachen University, etc.

[D] Benefits Derived From European Cooperation

In time, use of similar and compatible methods and tools.

Eureka
Theme: Euromatique - Artificial Intelligence

Artificial intelligence is a relatively broad field, of a horizontal nature at applications level. Three complementary aspects, at various levels, are required if artificial intelligence is to be used efficiently in the future.

- Material level:
Symbolic machines and processors;

- Basic software level:
Software environment for symbolic data-processing;

- Application level:
Software tools oriented to expert-system generation and utilization.

Four specific sheets define specific fields of action:

- Dedicated circuits and line of symbolic machines;
- Comprehensive tools for the development of expert-system applications;
- Multilingual data-processing system;
- Control and monitoring of major industrial processes.

Generally speaking, the operators concerned might be the following:

- In France:

- Manufacturers

AMAIA [expansion unknown], Bull, CGE, CGEE [General Association of Electrical Companies]-Alsthom, Cognitec, Copernique, ESD [Serge-Dassault Electronics], Framentec, TITN [New Technologies Data Processing], etc.

- Public Organizations

CEA [Atomic Energy Commission], Cesia, CNET [National Center for Telecommunications Studies], EDF [French Electricity Company], IEF [Basic Electronics Institute], LRI [expansion unknown], Paris-7 University.

- In Europe

- Great-Britain: ICL, INMOS [expansion unknown], LPA [expansion unknown], SDL [expansion unknown], etc.
- Italy: Olivetti, etc.
- Norway: Norsk Data, etc.
- Netherlands, Philips, Amsterdam University, etc.
- FRG: GMD [expansion unknown], Krupp, Siemens, etc.

Eureka
Theme: Euromatique
Project Sheet: Dedicated Circuits and Lines of Symbolic Machines

[A] Description

Nature

Development of a family of symbolic processors and associated software to support and integrate major artificial-intelligence applications: expert systems, knowledge bases, form recognition, etc.

Specific Interest

- Providing more power to the hardware;
- Integrating hardware into a complex real universe where it is necesary and important that it should be placed.

Spinoffs

Multiple applications in avionics, in the space field and for large manufacturing units.

Basic Technologies Involved

- Study of the hardware architecture of symbolic processors;

- Study of creation techniques for basic artificial-intelligence languages: Lisp, Prolog and object-oriented languages;

- Study of the integration of more traditional concepts into these languages: system, real time, database.

Working Schedule Contemplated

- Objective

The ultimate objective is the Gigalips.

- Working schedule

Stage 1:

- Integration of the various software concepts andtheir extensions on parallel and distributed aspects;
- Construction of adequate hardware using existing components.

Stage 2 - Using basic software components:

- Study and construction of new symbolic machines;
- Full integration into advanced applications.

[B] Possible Partners in France.

- Manufacturers

AMAIA, Bull, CGE, CGEE-Alsthom, Copernique, MATRA, TITN, Thomson, etc.

- Public Organizations

CNET, IEF (Basic Electronics Institute), etc.

[C] Possible Partners in Europe

- Great-Britain: INMOS, etc.
- Norway: Norsk Data, etc.
- FRG: Siemens, etc.

[D] Benefits Derived From European Cooperation

Integrating developments now scattered among various European research centers (MAIA [expansion unknown], INMOS transputer, etc.).

Eureka
Theme: Euromatique
Project Sheet: GeneralizedToolsfortheDevelopmentofExpert-System Applications

[A] Description

Nature

Development of a set of tools to develop expert systems.

Specific Interest

Making the expert-system technique available to European manufacturers in the near future.

Spinoffs

Multiple spinoffs in all industrial sectors.

Basic Technologies Involved

- Basic languages;
- Higher-level languages;
- Reproduction of reasoning, knowledge and learning;
- Man/machine interaction.

Working Schedule Contemplated

- Objective

Development of two sets of tools:
- Tools for the development of expert systems;
- Tools for the development of expert-system models.

- Working schedule

- Study and development of tools to develop operational expert systems using well-established representation and inference techniques (stressing portability, opening to the outside world and performance);

- Study and development of tools to develop system models (stressing power of expression rather than performance).

Two stages:
Stage 1: specification and validation through models;
Stage 2: tool development.

[B] Possible Partners in France

- Manufacturers

Bull, CGE, Cognitec, ESD, Framentec, etc.

- Public Organizations

LRI (Orsay), Paris-7 University, etc.

[C] Possible Partners in Europe

- Great-Britain: ICL, LPA [expansion unknown], SDL, etc.
- Italy: Techint, TXT [expansion unknown], etc.
- Netherlands: Amsterdam University, etc.
- FRG: Danet, Siemens, etc.

[D] Benefits Derived From European Cooperation

Integration of scattered developments in the various European research centers.

Eureka
Theme: Euromatique
Project Sheet: Multinlingual Information System

[A] Description

Nature

Natural-language querying and updating of comprehensive databases, i.e. databases that could contain text, graphics, images and possibly voice data.

Specific Interest

Entry and operation possible in various languages.

Spinoffs

Possibility of adding aids to translation.

Basic Technologies Involved

- Logic programming;
- Knowledge bases;
- Architecture;
- Man/machine interaction.

Working Schedule Contemplated

- Objective

Development of the system within 10 years.

- Working schedule

Representation of comprehensive electronic documents taking into account the logic and material structure of a document as well as its semantic content;

Comprehension of national languages and definition of a single European-language interface for document representation;

Man/machine interface at an individual work station to create, edit and alter electronic documents;

System for the acquisition and semantic analysis of "paper" documents prior to their entry into the world of electronic documents;

High-performance archival station provided with a database-management system suitable for storage and filing, for electronic-document querying (parallel-

architecture station including data-processing symbolic operators, screening operators, and accelerators of access to data stored in secondary memory);

Communication architectures and communication protocols between work stations and servers interconnected by a local-area or a long-distance network;

Aids to automatic translation, supported by the document database.

Launching Procedure - Management

Association of artificial-intelligence experts, manufacturers, service companies and pilot users.

[B] Possible Partners in France

- Manufacturers

Bull, CGE, etc.

- Public Organizations

INRIA, etc.

[C] Possible Partners in Europe

- Great-Britain: ICL, etc.
- FRG: GMD, Siemens, etc.

[D] Benefits Derived From European Cooperation

Rationalization, rapprochement and efficiency factor; cooperation in this field is self-evident.

Eureka
Theme: Euromatique
Project Sheet: Control and Monitoring of Major Industrial Processes

[A] Description

Nature

Study and develoment of tools making it possible to build control-aid systems integrating diagnostic, projections, decision-making and intervention follow-up in the field of industrial processes.

Specific Interest
Crucial application for economic and safety problems.

Spinoffs

Numerous industrial applications:
- Search for complex optimization compromises (quality, energy economy, etc.);

- Search for complex scheduling compromises;
- Diagnostic and emergency repair of the process or electronic equipment;
- Operator training.

Of interest to all large project owners and prime contractors.

Basic Technologies Involved

- Knowledge-representation techniques (formalism derived from logic, models, simulation, plans, etc.);
- Expert systems;
- Symbolic arrays;
- Ergonomics.

Working Schedule Contemplated

- Objective

Specification, then experimental implementation in one sector.

- Working schedule

- Study of time-representation techniques;
- Study of techniques for the qualitative representation of physical phenomena;
- Study and development of drawing generation and execution systems;
- Integration of the latest progress achieved in the field of expert systems;
- Development of evolutive hardware tools and their interfaces;
- Study of the man/machine interface;
- Implementation of deductive or associative-access databases;
- Consideration of implementation procedures.

[B] Possible Partners in France

- Manufacturers

Aerospatiale, CGE, etc.

- Public Organizations

CEA, CNES, EDF, etc.

[C] Possible Partners in Europe

- Netherlands: Philips, etc.
- FRG: Krupp, MBB, Siemens, etc.

[D] Benefits Derived From European Cooperation

Pooling study resources and broadening the potential market.

Eureka
Theme: Euromatique
Project Sheet: Europrocessor

[A] Description

MERCURE: European Microprocessor with Error-Proof Universal Connection Network

Nature

Study and development of a high-end flexible microprocessor in submicronic technology, for the next decade.

Specific Interest

Develoment of high-end microprocessors whose design and develoment will power advanced developments in the integrated-circuit and image-processing industry, a field in which the United States have a de facto monopoly. This new-generation processor is suitable for parallel processing

Spinoffs

- Development of a European integrated-circuit industry;
- Multiple applications in most large electronic and data-processing equipment;
- Major driving effect on the data-processing, electronic and telecommunications industries.

Basic Technologies Involved

- Micronic and submicronic technology (10^6 transistors per chip);
- Object-oriented parallel architecture;
- Software engineering.

Working Schedule Contemplated

- Objective

Development of the microprocessor by 1990.

- Working schedule

Development of the technology concerned:
- Performance definition;
- Definition of silicon-components;
- Definition of software tools;
- Pilot applications.

Software
- Core;
- Software-engineering workshop;
- Compilers.

Tests

- Validation with a scanning microscope;
- Production tests;
- Internal tests.

Complex-machine architecture

- Multiprocessor;
- Tolerance to failure;
- Distributed addressing;
- Data consistency.

Launching Procedure - Management

- Manufacturers' agreement on joint development, including a strategy leading to its adoption as a standard.

[B] Possible Partners in France

- Manufacturers

Thomson, etc.

- Public Organizations

CEA/LETI, CNET, etc.

[C] Possible Partners in Europe

- Great-Britain: GEC, INMOS, Plessey, etc.
- Netherlands: Philips, etc.
- FRG: Siemens, etc.

[D] Benefits Derived From European Cooperation

Cooperation is necessary to adopt a new standard; it is the only way to gather the resources required for a program of such a scope.

Eureka
Theme: Euromatique
Project Sheet: 64-Megabit Memory

[A] Description

Nature

Development of a 64-megabit dynamic RAM memory.

Specific Interest

Setting an ambitious objective to mobilize operators, and making intermediate stages possible.

Spinoffs

- Development of a European dynamic-RAM industry;
- Helping European industry catch up;
- Mastering a technology applicable to components other than memories.

Basic Technologies Involved

- Research on machines and basic technology;
- Research on memory point structure;
- Research on memory organization.

Working Schedule Contemplated

- Objective

Development of a 64-megabit memory by 1995.

- Working schedule

- Progressive development of components with increasing performance characteristics;
- Study of critical equipment for these structures of a size below 0.5 micron (lithography, scouring, automatic marking, white room);
- Technology and design of 3-D cells;
- Development of any non-available equipment;
- Construction of a pilot line.

Launching Procedure - Management

Constitution of a manufacturers' consortium.

[B] Possible Partners in France

- Manufacturers

Thomson, etc.

- Public Organizations

CEA/LETI, CNET, etc.

[C] Possible Partners in Europe

- Great-Britain: GEC, etc.
- Netherlands: Philips, etc.
- FRG: Siemens, etc.

[D] Benefits Derived From European Cooperation

Intensification of French participation in already existing projects between European manufacturers (Siemens and Philips' development program for 4-megabit memories).

Eureka
Theme: Euromatique
Project Sheet: European GaAs Circuit Plant

[A] Description

Nature

To achieve progress in high-speed component technologies, in particular GaAs components (e.g. pilot unit, foundry, etc.).

Specific Interest

- Transforming the high level achieved by European research on high-speed GaAs digital circuits into an industrial activity;

- Forming partnerships among European manufacturers in order to minimize the heavy initial investments required to acquire a strong position on a still weak international market within the next 3 to 4 years.

Spinoffs

In addition to military applications, the market for this type of civil-application components is likely to expand considerably if prices are considerably reduced:

- High-end data-processing equipment and supercomputers;
- Equipment related to control, maintenance, management and storage (energy).

Basic Technologies Involved

- TEGFET [two-dimensional electron-gas field-effect transistor] DCFL [expansion unknown] circuits;
- Three times faster than silicon for an equal consumption;
- 10,000 to 20,000 gates per chip;
- Applications:
    - Cache memory;
    - Arithmetic and logic units;
    - Signal processing;
    - High-speed random logic.

Working Schedule Contemplated

- Objective
Industrialization of European research in the sector.

- Working schedule

Construction of a European pilot plant;

Developments (carried out synergistically with silicon activities):
- Computer-aided design;
- Development of standard cells;
- Materials (zero defect);
- Packaging;

Looking for an agreement with one or several U.S. companies to gain access to the U.S. market.

Launching Procedure - Management

Creation of a European industrial consortium and of a European industrial program-management "entity."

[B] Possible Partners in France

- Manufacturers

Crismatec, MATRA, Thomson, etc.

- Public Organizations

CNET, CNRS, etc.

[C] Possible Partners in Europe

- Great-Britain: GEC, Plessey, STC, etc.
- Netherlands: Philips (LEP [Electronics and Applied Physics Laboratories] etc.
- FRG: Siemens, etc.
- Sweden: LME, etc.

[D] Benefits Derived From European Cooperation

Concerted research on all existing processes:

- coordination of efforts;
- reduction of R&D costs.

Eureka
Theme: Euromatique
Project Sheet: European "Custom" Circuit Plant

[A] Description

Nature

Development of the (proven and "mixed") technologies involved in a joint prototype plant.

Specific Interest

Development of techniques to design, produce and test complex signal-processing digital circuits much faster than it is possible today.

Spinoffs

Associating a higher training center to this plant, which will use the same equipment.

Basic Technologies Involved

Two approaches:
- 1.2-micron CMOS-type technologies;
- Compatible CMOS-bipolar type technologies.

Working Schedule Contemplated

- Objective

Rapid development of studies, then full-scale analysis.

- Working schedule

Studies to be undertaken:
- Simulation and modelling;
- Creation of a European library of micro and macrocells;
- Development of routing and interconnection software and of associated test-definition software;
- Assembly and interconnection methods;
- Testing means.

Means to be used :
- Creation of a joint European prototype plant, first using proven technologies to validate the techniques, and then a mixed technology well suited to this type of application.

Launching Procedure - Management

Creation of a professional technical center.

[B] Possible Partners in France

- Manufacturers

MATRA, Thomson, etc.

- Public Organizations

CNET, LETI, etc.

[C] Possible Partners in Europe

- Great-Britain: GEC, Plessey, etc.
- Netherlands: Philips;
- FRG: MBB, Siemens, etc.
- Sweden: LME.

[D] Benefits Derived From European Cooperation

Multiplicity of partners within a "professional center."

[II] Eurobot: Third-Generation Robotics, Automated Factory/Computer-Aided Design and Manufacturing, Lasers

- Civil-security robots
- Agricultural robots
- Automated factory/computer-aided design and manufacturing (CAD/CAM)
- CO_2, CO, excimer and free-electron lasers

Third-Generation Robotics

- Civil security robots

Development of self-controlled modular civil-security robots to replace man in high-risk jobs or jobs that cannot done by man.

- Agricultural robots

Development of a fully-automated programmable tractor that would increase the efficiency and value of agricultural work.

Automated Factory-CAD/CAM

- Highly-integrated automated and flexible manufacturing plant

Development of a plant which, in an industrial context, would integrate the product-design, management, production, manufacturing, administration and sales functions and would produce marketable goods, with a view to solving the technical, organizational and human problems not yet fully under control today.

CO_2, CO, Excimer and Free-Electron Lasers

Research and development of high-yield, high-power, high-penetration and/or high-collimation power-lasers for applications in industrial machining and assembly.

Eureka
Theme: Eurobot - Third-Generation Robotics

To develop third-generation robotics in Europe by means of a number of goal-oriented subprograms, each of which would be headed by a manufacturer, and

which would associate manufacturers, research centers and universities in European consortia.

- Robots to operate in the nuclear industry
- Civil-security robots
- Mining robots
- Robots for ocean environments
- Agricultural robots
- Industrial-cleaning robots
- Robots for civil engineering and construction
- Household robots

Three projects from this list could be implemented by priority:

- Civil-security robots
- Agricultural robots; and possibly
- Robots for ocean environments.

Generally speaking, the operators could be the following:

- In France:

- Manufacturers: Bull, CGE, Dassault, Renault, SAGEM [Company for General Applications of Electricity and Mechanics], SIETAM [expansion unknown], Thomson, etc.

- Laboratories: CEA, CNES [National Center for Space Studies], IFREMER [French Institute for Research on Ocean Development], IIRIAM [Marseilles International Institute for Robotics and Artificial Intelligence], LAAS [Automation and Systems Analysis Laboratory], LETI, etc.

- In Europe:

- Belgium: FN [Herstal National Factory], etc.
- Great-Britain: GEC, Lamberton, Meta Machines, Taylor Hitec, etc.
- Italy: Ansaldo, Comau, Elsag, Mectron (STET [Telephone Finance Corporation]), Olivetti, RSE [expansion unknown], etc.
- FRG: Fels, Fibro, Kuka, Siemens, etc.
- Sweden: ASEA [Swedish General Electric Corporation], etc.

Eureka
Theme: Eurobot
Project Sheet: Civil-Security Robots

[A] Description

Nature

Development of modular civil-security robots to meet the following fonctional requirements:

- Autonomy of movement

which would associate manufacturers, research centers and universities in European consortia.

- Robots to operate in the nuclear industry
- Civil-security robots
- Mining robots
- Robots for ocean environments
- Agricultural robots
- Industrial-cleaning robots
- Robots for civil engineering and construction
- Household robots

Three projects from this list could be implemented by priority:

- Civil-security robots
- Agricultural robots; and possibly
- Robots for ocean environments.

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- Laboratories: CEA, CNES [National Center for Space Studies], IFREMER [French Institute for Research on Ocean Development], IIRIAM [Marseilles International Institute for Robotics and Artificial Intelligence], LAAS [Automation and Systems Analysis Laboratory], LETI, etc.

- In Europe:

- Belgium: FN [Herstal National Factory], etc.
- Great-Britain: GEC, Lamberton, Meta Machines, Taylor Hitec, etc.
- Italy: Ansaldo, Comau, Elsag, Mectron (STET [Telephone Finance Corporation]), Olivetti, RSE [expansion unknown], etc.
- FRG: Fels, Fibro, Kuka, Siemens, etc.
- Sweden: ASEA [Swedish General Electric Corporation], etc.

Eureka
Theme: Eurobot
Project Sheet: Civil-Security Robots

[A] Description

Nature

Development of modular civil-security robots to meet the following fonctional requirements:

- Autonomy of movement

- Autonomy of decision
- Action on the environment
- User-friendly man/machine interface
- Cooperation and coordination.

The modular approach adopted makes it possible to contemplate designing and developing a line of robots that could operate in the following environments:

- Environments presenting natural hazards
- Environments presenting man-made hazards

to carry out the following tasks:

- Mine removal
- Fire-fighting
- Natural disasters, earthquakes
- Pollution control
- Monitoring
- Operations in radioactive, chemical and high-temperature environments.

Robots could replace man in high-risk tasks or tasks that man cannot carry out himself. They will thus preserve and save human lives.

Specific Interest

The emphasis placed on the modular design of robots will make it possible, on the one hand, to intensify appreciably the efforts undertaken in the generic technologies required for third-generation robotics and, on the other hand, to integrate these technologies into subsystems or modules suitable for the functions required in the environment considered.

With the modular approach, we can both develop generic R&D and have goal-oriented projects.

Spinoffs

In addition to scientific and technological spinoffs, there will be a considerable and rapid contribution to industrial robotics and to computer-integrated manufacturing.

Actually, any research we start must make it possible to design new robot architectures, to use new materials (gains of weight, speed, precision, cost, etc.), to improve man/machine interfaces, to increase decision autonomy (adaptation to environmental changes), etc., and possibly to experiment with cooperation among several robots, either to carry out a set of production tasks or for maintenance operations.

Without waiting for the development of applied robots for specific sectors, the technologies developed could be transferred to industrial robotics progressively as they are developed.

Basic Technologies Involved

As far as R&D is concerned, the development of such machines supposes that the following problems have been brought under control:

- Autonomy of self-standing on-board energy:
  - Lightweight materials
  - Locomotion
  - Navigation/guidance
- Autonomy of decision:
  - Sensors
  - Expert systems to generate drawings, artificial intelligence
- Action on the environment:
  - Arms
  - Operating organs ["effectueurs"]
  - Actuators
- Cooperation/coordination:
  - Communication networks between robots
  - Interfaces
  - Telepresence [as published]
- Resistance to the environment.

Working Schedule Contemplated

- Objective

- Creation of European workshops on themes that should be:
  - Goal oriented
  - Transversal: signal processing, navigation, energy storage, materials, micromechanics, ad-hoc hardening of technologies to reflect their specific applications, etc.;
- Contributions to the definition of European standards and compatibility rules;
- Creation of European experimentation and evaluation sites.

- Working schedule

5 stages:
1. Product and module definition;
2. Definition and implementation of R&D programs;
3. R&D evaluation as a function of defined products and modules;
4. Module integration, completion and testing;
5. Robot integration, completion and testing.

Launching Procedure - Management

Appointment of a project leader (agency created for a temporary period and supported by national relays, with respect to R&D as well as industrialization and marketing) to prepare, issue and study calls for bids, to appoint prime contractors (consortia of firms) and subcontractors, and to follow up and control the delivery of studies and the overall project financing.

[B] Possible Partners in France

- Manufacturers

CAMIVA [Associated Manufacturers of Fire-Fighting, Refuse-Collection and Aviation Equipment], G3S [expansion unknown], GIAT [expansion unknown], Hispano-Suiza, Technicatome, etc.

- Public Organizations

ADI [Data-Processing Agency], CEA, CEA/OREP [expansion unknown] CERT [Toulouse Study and Research Center], CESTA [Aquitaine Scientific and Technical Study Center], CNRS, INRIA, associated laboratories, etc.

[C] Possible Partners in Europe

- Great-Britain: Taylor Mitec, etc.
- Italy: FIAR [expansion unknown], Mectron, etc.

[D] Benefits Derived From European Cooperation

- Project requiring the mobilization of R&D capacities outside of the national context;
- Creation of a European supply on an expanding market;
- Encouraging the recovery of European supply in robotics and computer-integrated manufacturing.

Indeed, although the above-mentioned R&D orientations are clearly identified and are covered by current research projects, the scope of the goals set goes well beyond national R&D capacities; therefore, launching such a project at European level will make it possible to coordinate, or even to federate national R&D efforts in third-generation robotics and to accelerate their completion. In addition, a goal-oriented project will make it possible to ascertain European manufacturers' interest in, and commitment to taking position on a developing market already penetrated by the Americans and the Japanese.

Eureka
Theme: Eurobot
Project Sheet: Agricultural Robots (Automatic Tractor)

[A] Description

Nature

Development of a fully-automated programmable tractor meeting the following functional requirements:

- Autonomy of movement in unimproved environment;
- Autonomy of decision;
- Autonomy on the environment (plantation, crop, etc.);
- User-friendly man/machine interface.

These machines will have to be able to move about on any kind of terrain and in contact with living organisms (plants, animals) under highly variable temperature, humidity and light conditions and in the presence of dust and vibrations.

Specific Interest

- Improving the efficiency and value of agricultural work, making tasks less tedious. Possibility of working on hard-to-cultivate land.

- Bringing various research fields to interact in order to develop a tractor that will operate in unimproved natural environments.

Spinoffs

- Economic: avoiding crop losses as a result of bad weather;
- Social: restoring value to agricultural work.

Basic Technologies Involved

The problems are threefold:

- Mechanical: driving on all terrains, variety of tools, platform stability, etc.;
- Sensors: optical, thermal, mechanical, position sensors;
- Data-processing: the data-processing capabilities of these robots will have to integrate the latest results of artificial-intelligence research.

Working Schedule Contemplated

- Objective

- Creation of European workshops on themes that are:
    - goal oriented;
    - transversal: signal processing, navigation, energy storage, micromechanics, ad-hoc hardening of technologies corresponding to their specific applications, etc.
- Contribution to the definition of European standards and compatibility rules;
- Creation of European experimentation and evaluation sites.

- Working schedule:

5 stages:
1. Product and module definition;
2. Definition and implementation of R&D programs;
3. Evaluation of R&D as a function of defined products and modules;
4. Module integration, completion and testing;
5. Machine integration, completion and testing.

[B] Possible Partners in France

- Manufacturers

Renault, etc.

- Public Organizations

- ADI, Cemagref, CNRS, INRIA, etc.

[C] Possible Partners in Europe

- Italy: Fiat, etc.
- Sweden: Saab, etc.

[D] Benefits Derived From European Cooperation

Rapidity of implementation, pooling of multiple competence.

Eureka
Theme: Eurobot
Project Sheet: Highly-Integrated Automated and Flexible Manufacturing Plant - CAD/CAM

[A] Description

Nature

Development of an automated and flexible plant in an industrial context and through advanced data-processing and robotics systems, to provide integrated functions of product design, production management, manufacturing as well as administration and marketing (CAD, CAM, computer-aided production management, CAX [computer-aided X], etc.

This plant will have to produce marketable goods. The line of goods produced would meet one of the four following criteria:

- Goods for which the European industry is not represented;
- Goods having humanitarian functions (Third-World markets, equipment for the handicapped);
- Goods currently produced by European consortia;
- Prototypes (under certain conditions to be defined)>

Other types of goods can of course be contemplated (components manufactured in white rooms).

Among the various manufacturing processes, assembly/installation will receive special attention. In addition, the project shall have to rely not only on technical, but also on socioeconomic and organizational knowledge.

Specific Interest

Development of an operational unit implying that a solution is found to technical, organizational and human problems not yet fully solved today:

- Development of advanced-design components and subsystems:
  - Distributed and heterogeneous data processing;
  - Industrial local-area networks;
  - Robotized assembly cells;
  - Software for real-time management of production, for quality and maintenance management;
  - Distributed CAD, CAX systems;
  - Man/machine communication interfaces.

- Expertise in communication methods and techniques with reference to integration and man/machine relations:
  - Reference models (factory, factory environment, etc);
  - Communication protocols.

Spinoffs

- Scientific spinoffs
  - Real-time data processing;
  - Artificial-intelligence techniques and expert systems;
  - Optic communication systems, etc.

- Economic spinoffs:
  - Restructuring the demand to optimize the equipment lines offered and their manufacturing conditions, etc.

- Human spinoffs:
  - Design and implementation of innovative management methods with respect to organization and to operators' training and hiring, etc.

Basic Technologies Involved

- Artificial intelligence;
- Microelectronics;
- Optronics;
- Telecommunications: networks.

Working Schedule Contemplated

- Objective

The goal is not to design and implement a factory without workers, but a factory where all technical, organizational and human components are taken into account simultaneously.

- Working schedule

Four stages are contemplated:

1. Study and specifications;
2. Development and implementation;

3. Testing and evaluation;
4. Demonstration, training and production.

Launching Procedure - Management

Appointment of a project leader (agency created for a temporary period) to prepare, issue and study calls for bids, to appoint prime contractor (consortia of firms) and subcontractors, and to follow up and control the delivery of studies and the overall project financing.

The project leader will pilot the above-mentioned Stages 3 and 4. For stage 4, depending on the nature of the goods produced, marketing/distribution procedures remain to be defined.

[B] Possible Partners in France

- Manufacturers

Aerospatiale, Industrial Automation, CGE, MATRA, Peugeot, Renault Automation, SGN [General Company for New Technologies], Sodeteg Tai, etc.

- Public Organizations

ADEPA [Agency for the Development of Automated Production], ADI, CEA, CERT, CESTA, CNRS, INRIA, associated laboratories, etc.

[C] Possible Partners in Europe

- Great-Britain: GEC, etc.
- Italy: FIAR [expansion unknown], Fiat, Olivetti-Osai, RSE (STET group), etc.
- FRG: Siemens, etc.
- Sweden: ASEA, etc.

[D] Benefits Derived From European Cooperation

- Implementation of research carried out under Community programs: BRITE [Basic Research on Industrial Technologies for Europe], ESPRIT [European Strategic Program for R&D in Information Technology] (project finalization);

- Will amount to a European proposal for standardization of computer-integrated manufacturing [CIM];

- Structuring CIM at European level.

Eureka
Theme: Eurobot
Project Sheet: CO_2, CO, Excimer and Free-Electron Lasers

[A] Description

Nature

Study and development of high-yield, high-power, high-penetration and/or high-collimation power lasers.

Specific Interest and Spinoffs

Preparing the tools of the future integrated factory.

Basic Technologies Involved

- Plasma physics;
- Vacuum physics;
- Power follow-up control;
- Power electronics, servo-mirrors.

Working Schedule

1. CO_2 Laser

- Development of operational CIM tools: continuous lasers (10 microns) with a power in excess of 50 KW;
- Making a European tool available to major specialized laboratories;
- Development of an industrial source.

2. CO Laser

- Research and development of CO lasers continuous at room temperature, of average power (of the order of 5 KW) and with yields in excess of 20 percent (5.2 to 5.5 microns).
- First stage: power of a few tens of watts for communications, surgery.
- Second stage: power of a few watts for machining.

3. UV Lasers

- Research and development of high-power (1 kW and over) excimer lasers. Definition of a line of tools for treatment and machining;
- Research and development of excimer lasers (KeF, XeF) of a few joules, for micro-machining.

4. Free-Electron Laser

- Research on the potential of free-electron lasers. Development of prototypes of a few kilowatts.

Launching Procedure - Management

Consortium of European partners for each of the operations selected.

[B] Possible Partners in France

- CO_2 Alsthom, CGP [General CIM Company], CILAS [Laser Industrial Company], ETCA [Central Technical Establishment for Armament], FRAMATOME [Franco-American Atomic Construction Company], GIAT, MATRA, SGN, etc.
- CO: CILAS, etc.
- UV: CERCO [expansion unknown], CILAS, CIT [Industrial Telecommunications Company], CNET, ETCA, IMFM [expansion unknown], LDM [expansion unknown], LETI, Micro-Controle, SOPRA [expansion unknown], Thomson, Usinor, etc.
- Free-electron: CEA, etc.

[C] Possible Partners in Europe

CO_2:

- Belgium: CBL [expansion unknown], etc.
- Great-Britain: Ferranti, etc.
- Norway: Dama, Nurks, etc.
- FRG: Rofins Union, etc.

CO:

- Great-Britain: Ferranti, RSBE [expansion unknown], etc.
- FRG: DFVLR [German Research and Development Institute for Air and Space Travel), MBB, etc.

UV:

- Great-Britain: AWRE [expansion unknown], JK Lasers, etc.
- FRG: Garching, MBB-Lasau, etc.

[D] Benefits Derived From European Cooperation

- CO_2: sharing expenditures and markets;
- Others: expenditure-sharing and optimum use of resources, in particular human resources.

Appendix

CO_2-Laser CIM

The carbon-dioxide power laser is a tool which can be used on a wide range of materials: metals, alloys, ceramics, etc., and which can fulfill many functions: machining, welding, treatment, etc.

Possessing many qualities, it makes it possible to operate at very high speeds and is suitable for automation. In addition to the development of laser sources whose power would range from 1 kW to a few tens of kW, laser CIM

requires considerable progress of optical components, sensors and the control/command methods of processes whose basic physical mechanisms often still remains to be clarified. The robotization of laser processes will call for the design of original robots with large-dimension hollow axes, and above all for a thorough revision of present production methods, as laser CIM will make it possible to finish products (car frames, airframes, etc.) after the blanks have been assembled.

Continuous Carbon-Oxide Laser

The project consists in studying the possibilities of making continuous CO lasers operating in the neighborhood of room teperature. In a first stage, the project will consider small-size continuous lasers whose power will be limited to a few tens of watts. The main applications contemplated are long-distance communications and the medical field (surgery). The major advantage of CO laser, in addition to its yield which generally exceeds 20 percent, is its spectral emission range (5.2 to 5.5 microns) which makes it possible to transport beams through minimal-loss low-dispersion optical fibers (fluorinated glass). In a second stage, the project will consider the possibility of developing an industrial CO laser (power of a few kW) and the problems posed by the transport of a high-power beam through an optical fiber.

UV-Laser Micromachining

The development of excimer-type ultraviolet lasers is opening new prospects in the field of micromachining by very-high-resolution photochemistry. The energy of UV photons can be used for gravure, photodeposition or photopolymerization of a great many materials used in microphyusics, and in particular in microelectronics. The program may bear on the development of gas-phase or liquid-phase micromachining processes. Simultaneously, the study would bear on the development of various KeF or XeF excimer laser components possessing great homogeneity over an eight-inch section, reliable and with good power stability (10 joules per pulse at a few Hertz):

- optics: of lithographic-quality focusing, and displacement mechanics [as published] of very high precision;
- devices: optics for real-time position measurement with 0.1 micron;
- diagnostic: real time of gravure or deposition kinetics;
- formulation: of resins suitable for UV photo-ablation or photo-polymerization.

Surface Treatments Using High-Power UV Lasers

For machining and for the surface treatment of metallic and especially organic materials, pulsed excimer lasers offer possibilities that have hardly begun to be explored. One of the most outstanding results, photo-ablation in plastics or organic materials (bone, cartilage, teeth, cornea, etc.) is especially interesting because of the small extension or complete lack of thermally affected zone. The LSA (laser-supported absorption) conditions that have been shown to exist in metals will lead to new possibilities to obtain an amorphous surface and/or achieve impact hardening (placing the material in a pre-

stressed condition). The progress of this research will require the development of a testing device built around an excimer laser of medium high power (1 kW) and high repetition rate (about 1 kHz) based, for reasons of reliability, on the technique of discharge photo-triggered through pre-ionization.

[III] Eurocom: Research Networks, Wideband Network Equipment

- Data-processing networks for research
- Large European digital switch
- Wideband data-processing and automated office communications
- Wideband transmission

Data-Processing Networks for Research

Project aimed at promoting the development of data-processing networks for research and their interconnection between European countries, as an efficient joint system of information management is a prerequisite for European technological development.

Large European Digital Switch

Research and development of a public automatic switch for the future wideband digital network.

Wideband Data Processing and Automated Office Communications

Development of the equipment intended for users of the future wideband digital network.

Wideband Transmission

Research and development of long-distance transmission means for the future wideband digital network: fiber optics, satellite payloads.

Eureka
Theme: Eurocom
Project Sheet: Data-Processing Networks for Research

[A] Description

Nature

Creation of data-processing networks connecting the various operators and users of research at European level.

Specific Interest

The level of expertise in data-processing technology conditions the rate of progress of sciences and technologies; it provides indispensable supports to training, scientific exchanges and the storage of data and methods.

Spinoffs

The communication networks established in the world or research play a leading role in the development of new products and in the promotion of original methods; as a result, they have a driving effect on the industry and on the economy.

Basic Technologies Involved

Materials: transmission supports (satellites, optical fibers), general-purpose or specialized machines in large serving centers, storage means, "work stations," specialized (speech, text, image) terminals.

Creation of associated software, definition of standards or development of bridges.

Working Schedule Contemplated

- Objective

Coordinating and connecting communication systems used for research in various countries, with respect to the following:

- data processing:
Interactivity with non-specialization of terminals, virtual terminal;
Remote-submission of work;
File transfer;
Graphics.

- data communications:
Videotex;
Teletex;
Telefax.

- office automation:
Word processing;
Messaging: data; text.

- computerized conferencing (Forum).

- Working schedule

Promoting the development of data-processing networks for research in all European countries. Providing national-network interconnection under the best possible conditions.

Launching Procedure - Management

Definition, by the countries concerned, of a cooperation structure to ensure the development and interconnection of national systems.

[B] Possible Partners in France

- Manufacturers

Bull, etc.

- Public Organizations

MRT [Ministry of Research and Technology], CNRS, INRIA, etc.

[C] Possible Partners in Europe

Research centers and national data-processing networks.

[D] Benefits Derived From European Cooperation

The continued implementation of data-processing networks for research and their interconnection on a European scale is a prerequisite to the technological expansion of Europe. Active cooperation, leading to a measure of joint network management and promoted to the largest possible extent, will accelerate network implementation and facilitate their interconnection.

Eureka
Theme: Eurocom
Project Sheet: Large European Digital Switch

[A] Description

Nature

Development of an ISDN (integrated services digital network) switch of large capacity (over 100,000 lines) and wide band (64 kbit/s to 8 Mbit/s, with a throughput rate that could reach 34 or even 140 Mbit/s).

Specific Interest

To provide Europe with a major piece of equipment controlling the development of an all-digital wideband network.

Spinoffs

Development of the network, peripherals, terminals, services.

Basic Technologies Involved

- Research on architectures;
- Programming language;
- Specific components;
- Wideband connection matrix;
- Real-time software for communications processing, for operations and man-machine relations.

Working Schedule Contemplated

- Creation of a European consortium;
- Definition of specifications;
- Research and development;
- Equipment installation.

[B] Possible Partners in France

- Manufacturers

CIT-Alcatel, component manufacturers, etc.

- Public Organizations

DGT [General Directorate of Telecommunications], CNET, ETC.

[C] Possible Partners in Europe

- Great-Britain: Plessey, etc.
- Italy: Italtel, etc.
- FRG: Siemens, etc.

[D] Benefits Derived From European Cooperation

- Sharing expenditures;
- Opening public markets at European level;
- Standardization of European equipment.

Eureka
Theme: Eurocom
Project Sheet: Data Processing and Wideband Automated Office Communications

[A] Description

Nature

Development of equipment for the wideband ISDN to transport all information-distribution services, including videocommunications.

Specific Interest

Development of telecommunication systems which, while offering the "voice, data, fixed images" services of the "narrow-band" ISDN currently being set up, will allow general use of the interactive "high-quality moving images" service (video channel) for professional and industrial as well as for consumer applications.

Spinoffs

Development of the equipment-manufacturing industry and of services.

Basic Technologies Involved

- Research on architecture;
- Programming languages;
- Electronic components;
- Wideband and very-wideband connection matrix;
- Real-time software for communications processing, for operation and for man-machine relations;
- Very-high throughput bus;
- Archiving on digital optical disk;
- Confidentiality systems.

Working Schedule Contemplated

- Specification of standards;

- Development of small-capacity multiservice switches (essentially PABX [private automatic branch exchanges]) with very wide band (64 kbit/s to 34 Mbit/s and 140 Mbits/s);

- Development of consumer-oriented wideband interactive communication terminals (64 kbit/s to 8 Mbit/s): high-resolution low-priced color equipment (cameras, videotape recorders, receivers, projectors, etc.);

- Development of an extensive line of professional equipment to be connected to the digital ISDN network:
    - office work stations (64 kbit/s to 8 Mbit/s, 34 Mbit/s and 140 Mbit/s): wideband videotex, computer-aided instruction, computer-aided design, etc.
    - data-processing communication peripherals (64 kbit/s to 34 or even 140 Mbit/s): high-speed color printers, image-processing terminals, front-end communication equipment, file transfer, etc.
    - 34 Mbit/s videoconferencing;

and in particular:

- high-definition A4-size screens;
- document encoding by high-resolution scanners;
- archiving on digital optical disks;
- high-resolution high-speed telefax terminal;
- special software for high-throughput multiwindows;
- screen copying and printer modules;
- simplification of man-machine relations, ergonomics;
- image synthesis and processing software;
- data compression.

- Develoment of distributed multi-user data servers with very high capacities and throughput rates, and associated means of communication.

Launching Procedure - Management

- Creation of European manufacturers consortia.

- Joint specification and development of key network and system components (optoelectronics, high-speed integrated circuits).

[B] Possible Partners in France

- Manufacturers

CGE (CIT-Alcatel), SSII, Thomson, equipment and component manufacturers, etc.

- Public Organizations

CNET, PTT [Post and Telecommunications Administration], etc.

[C] Possible Partners in Europe

- Great-Britain: British Telecom, General Electric, Plessey, etc.
- Italy: Italtel, etc.
- FRG: Federal Post Office Administration, Nixdorf, Siemens, etc.

[D] Benefits Derived From European Cooperation

Sharing the effort made to develop specific (switching, transmission) systems for "wideband" applications.

Eureka
Theme: Eurocom
Project Sheet: Wideband Transmission

[A] Description

Nature

Systems for digital transmission at 2 Gigabits/s.

Specific Interest

Development of the wideband public network.

Spinoffs

Development of the telecommunications industry (peripherals, equipment) and services.

Basic Technologies Involved

- Single-mode optic fiber;
- Source, multiplexers, detector;
- Switched-beam microwave-frequency antennas;
- Signal processing and switching;
- On-board systems architecture.

Working Schedule Contemplated

- Research and development of 2-Gigabit/s fiber-optics transmission systems:
    - optimization of high-throughput optic link techniques;
    - definition and development of optoelectronic components;
    - optimization of fiber characteristics.

- Research and development of payloads for wideband (30 gHz) geostationary communication satellites.

Launching Procedure - Management

Creation of European consortia.

[B] Possible Partners in France

- Manufacturers

CGE, Lyons Cables, ESD, MATRA, SAT [Telecommunications Company], etc.

- Public Organizations

PTT, CNET, etc.

[C] Possible Partners in Europe

- Great-Britain: Plessey, etc.
- Italy: Italtel, etc.
- FRG: ANT [expansion unknown], Siemens, etc.

[D] Benefits Derived From European Cooperation

Cost and market sharing.

[IV] Eurobio

- Artificial seeds
- Control and regulation systems

Artificial Seeds

Production of artificial seeds that will look like and be used like present seeds, but will cause agricultural plants to produce not only a raw material but an industrial-processing tool as well, through the introduction of new catalytic functions into the plant, which will be used during the industrial technological processing of the plant matter.

Control and Regulation Systems

R&D programs on control and fine regulation techniques that could be used for the microadministration of drugs or therapeutic products by means of devices implanted on man, or for the servo-control of bioreactors.

Eureka
Theme: Eurobio
Project Sheet: Artificial Seeds

[A] Description

Nature

To create and multiply a somatic plant embryo obtained by cloning, coated with reserves and an artificial membrane, and which would look like an be used like present seeds, with improved qualities.

Specific Interest

- Improved selection;

- Creation of hybrid varieties freed from sexual reproduction;

- Transfer of genes modifying cultural qualities (resistance to stress, diseases and insects, etc.) and technological characteristics (protein content, enzymes useful during processing, etc.);

- Possible robotization of seed manufacturing, and also of certain parts of the downstream process.

Plant genetic engineering has made considerable progress during the past few months. It is now possible to introduce new genetic information in agricultural plants.

This artificial genetic alteration can improve the plant. But, above all, it becomes possible to introduce new catalytic functions into the plant, which will prove useful during the industrial technological processing of the plant matter.

This approach consists in causing the agricultural plant to produce not only a raw material, but also an industrial processing tool. It amounts to a redistribution of tasks between field and factory, and to a revaluation of the agricultural function.

The genes artificially introduced into the plant can also be relied on to synthesize molecules that will serve to preserve the food after its technological processing. The use of chemical preservation methods could thus be reduced so as to better respect consumers' needs.

Spinoffs

- Economic: giving European companies leading positions on the world seed market (potentially worth $10 to 12 million);

- Organizational and social: changing the task and added-value distribution of the agrifood business, restructuring and revaluation of the agricultural

profession at European level: transfer between industry and agriculture. Qualification.

In addition, regulations concerning the use of enzymes and micro-organisms in agrifood substances keep increasing, and the demand offered could solve toxicity problems by introducing the technological-processing catalytic function into the plant from the start.

Basic Technologies Concerned

- Genetic engineering applied to plants;
- Enzymatic engineering;
- Plant physiology;
- Embryo culture;
- Packaging;
- Biodegradable materials;
- Coating techniques;
- Soft dehydration technique;
- Final film-coating technique;
- Development of bioreactors.

Working Schedule Contemplated

- Associating a few large laboratories and a few large companies to work on the scientific and agronomic aspect. A few small or medium-size companies (biotechnologies, fermentators, etc.) could also participate.

- Acquiring knowhow on one or two varieties. Industrial implementation would then be allocated among the participants.

[B] Possible Partners in France

- Manufacturers

Clause, Claeys-Luck, Elf-Aquitaine, Limagrain, Rhone-Poulenc, SANOFI [Aquitaine Financial Corp for Hygiene and Health], etc.

- Public Organizations

CNRS, INRA [National Institute for Agronomical Research], universities (Compiegne Technical University, INSA [National Institute for Applied Sciences], university laboratories), etc.

[C] Possible Partners in Europe

- Belgium: Plant Genetic System, SES [expansion unknown], Ghent University, etc.
- Denmark: The Danish Sugar Factory, etc.
- Great-Britain: AFRC [expansion unknown], Agricultural Genetics Company, Shell Nikkerson, etc.
- Netherlands: Royal Sluis, etc.

- FRG: Hoechst, Max Planck Institute for Breeding Research (Cologne), KWS [expansion unknown].
- Switzerland: Ciba-Geigy, Sandoz.

[D] Benefits Derived From European Cooperation

The capacities of European teams are at least equal to those of North-American or Japanese teams, but they do not have the latter's cohesion, a decisive factor of success.

European cooperation is a must if we are to emerge at industrial level within a period of time comparable to those of our U.S. and Japanese competitors.

Eureka
Theme: Eurobio
Project Sheet: Control and Regulation System

[A] Description

Nature

R&D programs on problems of control and fine regulation for use in the microadministration of drugs or therapeutic products by means of devices implanted on man, or for the servo-control of bioreactors.

Specific Interest

Recent progress in the miniaturization of regulation electronics and in the knowledge of ultra-fine biological parameters (hormonal dosages), as well as the need for bio-industries to control multiple reaction parameters (fermentator operation) using sensors and sophisticated regulation systems, lead to the recommendation that an interdisciplinary program should be set up, under which experts in electronics and servo-controlled equipment (and miniaturized equipment in the case of biomedical engineering) would work together with experts in pharmaceutics, pharmacology and clinics.

Spinoffs

- New systems to admininister drugs, in particular those requiring regulated admission depending on biological parameters.

Example: implanted pump system whose flow-rate is regulated continuously by physiological probes (insuline-diabetes, hormones-growth, etc.).

- New servo-control systems for biological reactors, continuously optimizing the bio-reactional environment so as to obtain the best yields in continuous operation.

There are a huge number of potential spinoffs in the health field: answering certain diseases or insufficiencies in a non-constraining manner, etc. as well as in the health-economics field: lower doses of therapeutic products, possibility of "decentralized" health care, etc.

There are also spinoffs in the bio-industries.

Basic Technologies Involved

- Biological and medical engineering;
- Electronics;
- Bioreactors.

Working Schedule Contemplated

- Expanding a project now under consideration with Siemens, concerning the microadministration of drugs by implanted devices;
- Research on sensors;
- Research on pumps and pump servo-control

[B] Possible Partners in France

Elf-Aquitaine, pharmaceutical groups, perfusion-pump manufacturers, etc.

[C] Possible Partners in Europe

Behring, Siemens, pharmaceutical companies.

[V] Euromat

Advanced-design industrial turbine

Development of structural materials through the construction of a high-efficiency industrial turbine.

Eureka
Theme: Euromat
Project Sheet: Advanced-Design Industrial Turbine

[A] Description

Nature

Turbine for land thermal engines of 500-1000 hp, high reliability and energy-efficiency exceeding 45 percent (industrial turbine).

Specific Interest

Increasing competence in the development and use of new materials in a single dynamic system (assembling and bonding different materials), of the "thermal engine" type.

Spinoffs

Enabling Europe to catch up in the field of ceramics.

Multiple sectors: space program, shuttle, automobiles, turbomachines, aeronautics. etc. Land and mobile-land applications.

Basic Technologies Involved

- Ceramics-to-metal bonds;
- Ceramic-ceramic composites;
- Resistance in corrosive atmospheres;
- Sintering of complex parts.

Working Schedule Contemplated (4-5 years)

1. Setting up the European project: identification of the partners and their contributions.
2. Designing the turbine and its components;
3. Drawing.
4. Research on materials: finding the optimum material for each component. Implementation of these materials.
5.Fabrication and partial testing of components (temperature exhangers, turbine, etc.).
6. Development of a demonstration model.

[B] Possible Partners in France

- Manufacturers (engine manufacturers and materials producers)

Alsthom, Ceraver, Hispano-Suiza, Rhone-Poulenc, SEP [European Propulsion Company], Turbomeca, Aubert & Duval, Imphy, SNECMA [National Aircraft-Engine Study and Manufacturing Conmpany], Framatome, Pechiney, Aerospatiale, etc.

- Public Organizations

ONERA, CNRS, etc.

[C] Possible Partners in Europe

- Great-Britain, AME [expansion unknown], British Ceramic Association, Harwell, Lucas, Rolls-Royce, etc.;
- Italy: Alfa-Romeo, Fiat, etc.
- FRG: BBC [Brown-Boveri Company], KHD [expansion unknown], KWU [expansion unknown], MTU [expansion unknown], Rosenthal, Technik, etc.

[D] Benefits Derived From European Cooperation

Enabling manufacturers to make a considerable and relatively long-term investment to constitute a common scientific and technical base.

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SCIENTIFIC AND INDUSTRIAL POLICY

VARIOUS EUROPEAN AGENCIES, FIRMS ANNOUNCE EUREKA PROPOSALS

France's CEA To Participate

Paris ELECTRONIQUE ACTUALITES in French 17 Oct 85 p 2

[Article signed R.V.: "At a Symposium Organized for its 40th Anniversary, the CEA Stressed Its Determination to Be Represented in Eureka, in Space and in the Ocean"]

[Excerpt] Some 250 people, including CGE [General Electricity Company], Thomson, Jeumont-Schneider, TRT [Radioelectric and Telephone Telecommunications] and Intertechnique executives, took part in a symposium organized on 14 October by the CEA [Atomic Energy Commission] to celebrate its 40th anniversary.

Certainly, as Mr Renon, CEA general director, pointed out, the nuclear sector will remain the "backbone" of CEA operations in years to come. But the CEA also intends to continue its research in non nuclear fields, especially in micro electronics. This symposium also gave the CEA an opportunity to stress its determination to be represented in space and ocean research: "We are ready to participate in the conquest of space and that of the oceans," Mr Renon stated in the presence of Mr Curien, minister of Research and Technology.

The CEA also wishes to participate in the European Eureka technological cooperation program and it has already proposed various projects: as Mr Curien observed, the CEA can decidedly play "a very important part in Eureka."

To Mr Renon, who also stressed the CEA's determination to continue its major basic research effort, Mr Curien answered: "You shall have the means to do so..."

The symposium of 14 October also gave the CEA an opportunity to stress its determination to "develop its pool of knowledge," especially in electronics, data processing and robotics, and to be "a privileged meeting place for researchers and manufacturers, a place where many technology transfers could develop."

In this respect, we should also note that, precisely to make such technology transfers easier, the CEA, for instance, just created a robotics and CIM [computer-integrated manufacturing] office, a light horizontal structure to coordinate the activities of the CEA's various directorates and subsidiaries in this field, which intends to "speak with one voice" to the CEA's partners and in particular, of course, to manufacturers. This office, the CEA indicated will "provide a connection between the various scientific and industrial entities to preserve their own dynamisms and help promote their activities as a whole."

CERN Offers Superconductivity, Cryogenics

Paris AFP SCIENCES in French 17 Oct 85 p 17

[Article: "The CERN Unveils Its Proposals for the Eureka Project"]

[Excerpt] Geneva--On 14 October in Geneva, Mr Herwig Schopper, general director of the CERN [European Nuclear Research Center], the European laboratory for particle research, unveiled the CERN's collaboration proposals to the European Eureka technological research project.

Mr Schopper pointed out that this collaboration was strictly for "civil" purposes, which might materialize in two of the laboratory's special fields: superconductivity technology, its corollary, cryogenics (methods to conserve electric current energy and to cool cavities to make this economy of energy possible when magnetic fields are created), and data-processing networks.

Aeronautics, Aerospace Firms Link Up

Paris AFP SCIENCES in French 17 Oct 85 pp 17-18

[Article: "Eureka: Cooperation Agreement Between the Five Leading Eruopean Aeronautics Companies"]

[Text] Paris-- The five leading European aeronautics and space companies--Aerospatiale (France), Aeritalia (Italy), British-Aerospace (Great-Britain), CASA [Aeronautics Engineering Company] (Spain) and Messerschmitt-Boelkow-Blohm (FRG) have signed a cooperation agreement as part of the European Eureka program, Aerospatiale announced on 16 October.

The communique indicated that the five European partners have agreed to "define possible projects according to principles defined by their respective governments in the aeronautics and space sectors."

These aeronautics firms have already cooperated in the past, in particular for the supersonic Concord, the Airbus, the ATR commuter aircraft, the Tornado fighter, the Ariane launcher and satellites TDF1-TV Sat).

The aeronautics manufacturers will furthermore define the domains in which their cooperation will be implemented, e.g. electronics, computer-aided design and manufacturing, the development of large data processing programs, robotics, lasers and fiber optics.

This agreement among manufacturers, signed on 15 October, the communique added, will also make it possible to include other companies, should the partners so decide, either as new partners in the general agreement or as associates in specific projects...

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CSO: 3698/108

SCIENTIFIC AND INDUSTRIAL POLICY

SEPTEMBER ESPRIT MEETING HIGHLIGHTS 7 PROMISING PROJECTS

Paris ZERO UN INFORMATIQUE HEBDO in French 30 Sep 85 pp 1, 3

[Article by Nicolas Rousseaux: "ESPRIT, in Short Steps..."]

[Text] The European ESPRIT program [European Strategic Program for R&D in Information Technology] is starting its second year of existence. Already, a few material results. But manufacturers are hoping for more, for a broader scope, for a longer range...

The symposium on the ESPRIT program organized in Brussels last week ended with the presentation of a provisional assessment of European collaboration in R&D in information technology.

Michel Carpentier, 54, head of the task force for telecommunications and information technologies stated that he was pleased: "Last year, 106 European projects were launched. This year, a total of 67 will be added. Four hundred and fifty organizations are represented, including about 100 universities and 80 research centers. Fifty percent of the partners are small or medium-size businesses and we counted 1,300 researchers on the front line. The program as a whole was to be launched over four years; it ended up being launched in one and half years. There will be a new call for bids next year, if only to integrate the Spanish and Portuguese cooperation.

Yet, this symbiosis between strategic approach and an industrial initiative is just a drop of water in the ocean of research and development. All the funds allocated to ESPRIT, i.e. $270 million per year, represent .8 percent of the effort worldwide, or 2.5 percent of the global European effort. True, ESPRIT will take into consideration only "precompetitive" research projects, which are not the essential part of R&D worldwide (about 10 percent)... This is also one criticism that can be addressed to the program: it is operating too far from the sales, marketing and production departments of businesses.

7 Major Projects

As it, too, is concerned about efficiency and profitability, the European Community Commission, which supervises the Task Force, has identified seven projects of the ESPRIT program which are likely to yield some interesting results:

- Production of an efficient solution for a particular type of VLSI architecture, with the possibility of designing a digital filter for a complex integrated circuit within one week, using computer-aided design (collaboration of six companies including Philips, Siemens, Silvar-Lisco, the Ruhr University and two Belgian companies: BTM [expansion unknown] and Imec).

- Development of the Omega product, a knowledge-base development environment.

- Operational control for the integration of robotics systems, with numeric control applications.

- Development of 256-bit RAM circuits with an access time of 1.5 ns. Also, announcement of a 1-K memory with a longer access time (3.4 ns) but a low dissipation power (projects on which Plessey, Philips, Siemens and Thomson-CSF are working, and were joined by General Electric Great-Britain, Bell Telephone Belgium, the CNET [National Center for Telecommunications Studies], etc.).

- Tool for optimized access to databases, also called Loki (Logic-Oriented approach to Knowledge and databases supporting user Interaction). That product was awarded a prize at the 1984 European conference on artificial intelligence. Among the companies involved, we note: Fraunhover, SCS [expansion unknown] and Inca on the German side, Cranfield and Scicon on the British side, Bim (Belgium) and the University of Crete (Greece).

- Definition of a standardized office-automation architecture with text, voice and image integration (Siemens, CGE [General Electricity Company]-Thomson-CSF, Queen Mary College).

- First prototype, based on ADA, of a structure providing support for a portable-tool family environment. Software development progresses in concert with other ESPRIT projects, and outside ESPRIT. The participants are Bull, General Electric and Inter Comp. For Great-Britain, Nixdorf, Olivetti and Siemens.

The National-Champion Syndrome

Some manufacturers attending the closing meeting, last Wednesday, commented on and criticized the evolution of the program.

To begin with Robert Wilmot, 40, chief executive officer of STC [Storage Technology Corporation] and ICL [International Computers Ltd.] since the 1984 merger, who advocated the advent of a homogeneous market in Europe, with a mass of businesses capable of making a name for themselves. "Europe suffers from the syndrome of the national champion in each country. It is mathematically impossible for national intiatives to conquer global markets. As far as ICL-STC is concerned, we have set a goal for ourselves: by 1990, one third of our products will have to meet international standards. The recent project concerning ES2, European Silicon Structures, it seems to me, is a step in this direction, an ideal vision, the association of the California and Japanese spirit. But time is playing against us. ESPRIT alone will not solve the problem!"

Prof Pierre Aigrain, 60, former secretary of state, scientific advisor the the management of the Thomson group, noted for his part that "ESPRIT has proved successful in precompetitive research. It has generated an ambiance, a psychology. It must now go on and expand while improving control methods. Anyhow, even in the largest companies, not all technologies are fully available. In the future, the industry will be confronted with multitudes of solutions. The most competitive means will have to be chosen... Hence the concept of risk sharing."

Finally, Dr Wisse Dekker, too, 61, chief executive officer of the Philips group since 1982, gave a warning and denounced European shortcomings: "Market fragmentation, cumulated-cost impact, lack of access to university research, low adaptability... an education policy that needs redefining. I am in favor of expanding ESPRIT to projects closer to the market, and I also suggest other solutions: organizing the market potential, working on European series standards, adopting uniform infrastructure standards, abolishing financial transactions across the borders."

With respect to ESPRIT's being removed from marketing concerns, some of the speakers pointed out the advantage of Eureka over its European counterpart. However that may be, a report on the effectiveness of ESPRIT, written by three independent European personalities, will be published this year, around mid-October.

To quote Michel Carpentier, "the national fragmentation of European attitudes" still hinders exemplary innovations like ESPRIT. But we have the feeling that things are moving, in short steps... ESPRIT is breeding other programs: BRITE [Basic Research in Industrial Technology for Europe), RACE (Research and Development for Advanced Communications in Europe), etc.

The examples of MCC (Microelectronics and Computer Technology Corp.), SCR (Semiconductor Research Corporation), MCNC (Microelectronics Center of North Carolina) in the United States, and ICOT (Institute for New Generation Computer Technology) and the Sigma (industrial software production) and Jupiter (advanced data-processing technology) programs in Japan confirm, if need be, the scope of its influence.

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CSO: 3698/136

TECHNOLOGY TRANSFER

BRIEFS

RENAULT EQUIPMENT TO USSR--Renault was just awarded a contract worth FF 470 million to supply capital goods to modernize the AZLK [expansion unknown] factory (near Moscow) in preparation for the production of a new medium-priced Moskvitch vehicle. The contract provides for the supply of automated welding and assembly lines and will benefit mostly Renault, but it also includes large orders for several other French companies. The contract was negotiated under the draft agreement signed on 25 November 1983 by Renault and the Soviet Ministry of Foreign Trade. The first contracts between the French manufacturer and the USSR date back to 1958, and a first agreement with Moskvitch was signed already in 1966. As is known, the operations of Renault Automation as a whole, which focusses on products and services related to computer-integrated manufacturing, resulted in sales of FF 1,855.5 million in 1984, for a personnel of 3,076. [Text] [Paris ELECTRONIQUE ACTUALITES in French 25 Oct 85 p 12] 9294

CSO: 3698/116

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